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Duxbury (Dana) and Associates, Andover, MA

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NOVEMBER 5-7, 1990

SAN FRANCISCO, CALIFORNIA

Sponsored by
U.S. Environmental Protection Agency
Co-Sponsored by
California Department of Health Services
and
California Integrated Waste Management Board
Conference Managed
by
Dana Duxbury & Associates
and
GRCDA

Proceedings Prepared by
Dana Duxbury & Associates
16 Haverhill Street, Andover, MA 01810
March 1991

DANA DUXBURY & ASSOCIATES

Dana Duxbury & Associates (DD&A) was established in 1988 to tackle waste management problems. DD&A specializes in integrated solid and hazardous waste management, pollution prevention, recycling and household hazardous waste management (HHWM) issues.

DD&A provides policy, planning, research, technical assistance, facilitation and educational expertise on solid and hazardous waste management to government, industry, and public interest group clients.

GRCDA

GRCDA is an association of solid waste management professionals which provides a vehicle for information exchange among those in the solid waste management field.

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U.S. ENVIRONMENTAL PROTECTION AGENCY

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

NOVEMBER 5-7, 1990 SAN FRANCISCO, CALIFORNIA

MONDAY, NOVEMBER 5, 1990

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Office of the Mayor
SAN FRANCISCO

ART AGNOS

WELCOME BY MAYOR ART AGNOS
HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE
Nov. 5, 1990 San Francisco, California

On behalf of the city of San Francisco, I extend our city's welcome to you.

We are honored that you have chosen us as the host city for this conference.

You arrive on the eve of an election that is important to California and important to the nation.

Californians will be voting on measures affecting the environment, pesticides and our natural resources.

One of the clear signals that we already can see in this election is that the voters know which direction they want -- and now the debate is about implementing a strategy.

There can be no doubt that the voters want steps taken to assure environmental protection.

The challenge of protecting our environment, and specifically the challenge of meeting hazardous waste problems, is one that the voters can help meet after the election is over.

That is where you come in -- and where a state like California and a city like San Francisco can help make a difference.

Since the first programs for household hazardous waste began in 1980, over 2,600 programs have begun in 48 states.

California is the first state to have over 500 existing household hazardous waste programs.

San Francisco's Household Hazardous Waste Collection Facility is one of the first permanent facilities in the nation.

200 CITY HALL, SAN FRANCISCO, CALIFORNIA 94102
(415) 554-6141

It opened its doors three years ago and has doubled participation from users from 3,000 in 1988 to 6,000 in 1990.

Our program also is successful at recycling 75% of the hazardous waste that comes into the facility -- such as paint, oil and antifreeze.

During your visit here, we encourage you to take tours of our facility.

I also want to encourage you to give us your suggestions on how we can do more.

I believe that what we can accomplish here in San Francisco, not only is important to the well-being of our own city, but also may present an opportunity to teach other cities.

Last year, during a trip to Pacific Rim nations to discuss San Francisco's ties to business and other activities of mutual interest, one of the recurring topics was interest in San Francisco's environmental agenda.

In Japan and in China, there is growing concern about air quality, water quality and hazardous waste.

What must be made clear is that the process of education about hazardous waste -- and a plan to handle it safely -- involves consumers as well as producers.

That will become increasingly important in those nations since their pattern of consumer income now has placed them at the levels the U.S. has experienced.

I would like San Francisco to be a city that can offer a model -- just as we have in open space requirements -- of an environmentally safe city with high consumer awareness.

During your conference, I hope that you will help us focus on those issues.

I also hope that during your stay you will take the opportunity to get to know our city better.

This is one of the most beautiful times of year and we look forward to extending our hospitality to you.

We are a city of great diversity -- from Chinatown and Fisherman's Wharf to North Beach and Ocean Beach, the Mission and Union Square, there is something from every community and every culture to make you feel at home.

As Mayor, I hope that you come to feel that we are a city where you can feel at home, and I can promise you that we will try to make you leave your heart in San Francisco -- so that you will return to visit us again and again.

Welcome -- and our best wishes for the best conference ever.

Household Hazardous Waste Speech: Jack Kearns

Mayor Agnos, guests. It is a pleasure to represent the Toxic Substances Control Program and the Department of Health Services in opening the 5th National Conference on Household Hazardous Waste. In joining with the Environmental Protection Agency and the California Integrated Waste Management Board we recognize that this is an important program. It is most appropriate that we are in San Francisco which has one of the finest household hazardous waste facilities anywhere in the country. Some of you have toured or will have the opportunity to visit that facility. What you will see is the product of a public/private partnership which provides a valuable service to the community. Let me commend the Mayor, the staff of the City and County of San Francisco for their collective leadership in making the facility a reality.

Much has been done and one only has to look at the agenda to see the wide diversity of programs underway nationwide and world wide. However, we all have more work to do. The issue of Household Hazardous Waste collection and management programs is one which touches and involves everyone. We have seen how important it is that all our citizens learn to properly manage the hazardous wastes in their homes. We need to add to that knowledge in the critical area of consumer demand. If, ultimately, we turn away from the products which leave a hazardous waste through their use/and demand safer, non-toxic alternatives, we will find a response in industry which benefits us all.

In California through the initiative process, sweeping political and social changes have occurred:

Proposition 13 - caused revolutionary changes in the area of real estate taxes

Proposition 65 - required labelling of products that contained cancer-causing chemicals

and in 1988

Proposition 105 was passed by the people of California and a segment of your program is directed toward this subject. Among these things, it requires retailers to devote at least 10% of their annual advertising budget to informing the public that theirs is a household toxic product.

We hope this education of the public is the wave of the future.

Certainly, the household and our schools are vital arenas for education. We need to commit to the 3 Rs: Reducing, Reusing and Recycling hazardous household products. We need to use these products safely and take advantage of the innovative programs available to dispose of them. Finally, we need to educate so that people will choose the alternatives which are now/and will be increasingly more available that offer greater health and environmental protection.

Your work is well begun. Thank you for your involvement and I wish you a conference of accomplishment and energy.

REMARKS BY SYLVIA LOWRANCE
AT EPA'S 5TH ANNNUAL HOUSEHOLD HAZARDOUS WASTE CONFERENCE
SAN FRANCISCO, CALIFORNIA
NOVEMBER 5, 1990

I'd like to welcome you to EPA's 5th Annual Household Hazardous Waste Conference.

Over the past five years, the focus of municipal solid waste management as well as household hazardous waste management has changed dramatically.

It has changed because we have learned that pollution prevention--including source reduction and recycling--is the most effective, long term strategy for dealing with concerns regarding environmental contamination from any wastes, and to address our critical disposal capacity crunch for municipal solid waste.

Our latest report on municipal solid waste shows a jump of close to 13 million tons more being generated annually--for a new total of 180 million tons. The average American now throws away 4 pounds of garbage a day.

And as the generation of municipal solid waste continues to increase, the capacity to handle it is decreasing. Many landfills and combustors have closed, and new disposal facilities are often difficult to site.

We are about to issue new municipal solid waste landfill rules that will result in major changes in the way many landfills are operated, designed and located. These new standards will increase the cost of landfilling and will result in the closing of obsolete landfills. We hope that the rule will help in providing increased public confidence in landfills and the siting process. But, we also expect that the rule will promote increased local government focus on source reduction and recycling.

Five years ago, EPA's "Municipal Solid Waste Program" was made up of a handful of people who predominately worked on land disposal issues. Now the Municipal Solid Waste Program includes almost 50 people in our headquarters and regional offices and our highest priorities are source reduction and recycling.

These priorities are outlined in our municipal solid waste strategy -- "The Agenda for Action." The Agenda includes a hierarchy of solid waste management options with source reduction at the top, followed by recycling, and with landfilling and incineration forming the base.

Household hazardous waste management has followed the same trend. In 1985, there were 175 household hazardous waste programs in the country. In 1989, there were 1,000 programs.

Starting with one day household hazardous waste collection programs that focused primarily on safely collecting and disposing of household hazardous waste in hazardous waste landfills or other facilities, we are now moving to programs that try to identify and implement innovative ways of handling household hazardous waste and educate the public on source reduction.

Nearly all collection programs try to recycle as much "waste" as possible. For example, paint and used oil, two of the largest volume wastes most programs receive, are often sent to reprocessing facilities where they can be recycled. Some programs are doing the same with batteries.

Also, most of the programs today are developed hand in hand with aggressive education programs that strongly promote pollution prevention through recycling and source reduction. These programs do more than provide information about where and when collection programs will be held. They provide information about hazardous consumer products and their alternatives--and, most importantly--the impact consumer choice can have on manufacturers' decisions. Such information can lead to consumer demand for products that do not contain hazardous constituents.

And Americans in growing numbers are showing they support such efforts. Since the first Earth Day, 20 years ago, the number of environmental organizations in the United States has risen from 976 to 18,000. A recent Gallup poll reported that 83 percent of the American public have changed in some way their shopping and living habits to help protect the environment. And, 30 percent have boycotted a company's products because of its record on the environment. Clearly, Americans today are making their environmental preferences known.

What is happening appears to be the emergence of a growing national environmental ethic. Americans are not only taking a real interest in the environment--they are taking actions to prove their commitment. And, because the problems of the environment are so intertwined, we are all beginning to realize that it will take all of us--the individual, industry, and government--working together to seek new and creative solutions to environmental problems.

Where do we go from here? We continue to emphasize source reduction and recycling. We still have much to learn about these two techniques, particularly source reduction. If source reduction were implemented to its fullest by all sectors of society, most household hazardous products would be replaced by less problematic alternatives.

But to get source reduction really moving, all sectors of society must respond to challenges.

We must all become better educated consumers. Consumers can demand less toxicy products and packaging. But source reduction is more than being willing to buy alternatives that can be used and perform in the exact same way as the hazardous product. Consumers must be willing to make changes in their behavior, such as taking a little more time to mix soaps or detergents, or use a bit more elbow grease and a little less hazardous product. The bottom line is that if we want manufacturers to make changes, we must be prepared to commit ourselves to support their efforts.

Secondly, business and industry have an important leadership role in applying the power of the marketplace to environmental goals. One of industry's biggest challenges will be to reduce packaging, and provide products that are longer-lived, repairable, less toxic or non-toxic. They can also establish internal controls to ensure against misleading information in products and packaging.

The manufacturing sector must harness its tremendous creative and technical expertise and focus greater effort on waste reduction. Even if their products and manufacturing processes meet all regulatory standards, manufacturers should

still be alert for opportunities to identify toxic components or unnecessary waste production in their products. They must focus their research and expertise on new approaches, new technologies, new processes, even new products that do not use toxic constituents or produce more waste than is necessary.

Are any manufacturers meeting this challenge? We are, of course, just at the beginning of our discovery process, but there are a few examples of positive action:

o Alkaline battery manufacturers are working to reduce the level of mercury used in batteries.

o Mercury fungicide producers have come to an agreement with EPA's Office of Pesticide Programs to stop the use of such fungicide in indoor latex paints.

o On the volume reduction front, we've heard of several efforts to reduce packaging waste. One large retail store is identifying unnecessary packaging just by walking through their warehouses and stores. For example, they discovered that they had been selling basketballs in boxed packages. They are now changing this policy and are selling basketballs unpackaged.

And finally, there are challenges for the public sector. Government has an important role in educating consumers on the environmental impacts of their purchasing choices.

The public sector must provide incentives for change to occur. These could be straight economic incentives such as charging consumers for the amount of waste they throw away. Known as unit based pricing, this is a direct incentive to reduce waste generated. Award programs to highlight safer alternatives also provide incentives. We must develop and enforce requirements for designing and operating landfills and incinerators in an environmentally sound manner. And finally, we must conduct research and develop new information that will help us all meet these challenges.

Research in the household hazardous waste area could include an evaluation of alternative products, identifying sources of toxic constituents, and understanding the lifecycle environmental impacts of products.

EPA's Office of Research and Development has initiated a "Clean Products" program that will support university research into alternative products and include environmental factors into the decision making of product designers.

We in the Office of Solid Wate are investigating the sources and potential substitutes of some toxic constituents in municipal solid waste. We began with lead and cadmium and now are looking into the sources of mercury.

This summer, EPA began a major research effort to develop standard methods for conducting lifecycle analyses so that we can better evaluate the environmental impacts of products. To do that you must look at all of the natural resource, energy, and pollution factors associated with each step in the product's manufacture, distribution, use and disposal. We need good answers to these questions, so that government, industry, and consumers can make informed choices.

You will hear more about all of these EPA projects and many others during the course of this conference. We invite your comments on programs and suggestions for future work.

Source reduction and recycling are good for the economy. They reduce costs of disposal, substitute for new inputs of virgin materials, reduce energy costs, provide revenues from the sale of recyclables, and give firms a market and public image bonus. They also conserve valuable natural resources.

Many industries--paper, glass, steel, aluminum and plastics--are increasing the amounts of recycled materials used in their products. State and local governments are working hard to build markets for recycled products and to treat this as an economic development challenge. They are forming partnerships with the private sector to set voluntary goals and establish needed collection and manufacturing infrastructures. And, they are

working on a regional basis to sell their collected materials and to attract new recycling businesses. EPA is supporting these efforts with market studies and information. Almost 40 States give some preference to recycled goods, especially paper products.

Pollution does not respect boundaries--either state or local. We must all work together to develop public-private partnerships and cross-jurisdictional solutions. At home, local communities need to work together to promote source reduction, most economically set up recycling programs, and site environmentally responsible facilities.

Source reduction and recycling are the solid waste solutions for the 90's, but they depend upon our willingness to change our lifestyles and make a personal commitment to the environment. Those of you here today are in unique positions to help inform the public and make source reduction and recycling of household hazardous waste part of the "lifestyles" of your communities.

In so doing, you are laying the groundwork for a cleaner and healthier environment for the 21st Century. And when the people of that Century look back at us, I hope they will be scratching their heads wondering why we spent so many resources making buying, using, and disposing of products containing hazardous and unnecessary components. Thank you.

WHERE WE ARE - WHERE WE'RE GOING

BY DANA DUXBURY

Household Hazardous Waste Management Programs (HHWM) increased significantly in 1990. Figure I shows the number of programs per year with nearly one third of the programs that were held since 1980 being held in 1990 (885). Since 1980 a total of 2916 programs have been held in the U.S. In Figure II, the total number of programs per state is shown. While in Figure III the number of programs per year and per state is documented. Each of these programs is listed in three publications available from Dana Duxbury & Associates: 1980-1987, 1988-1989, and 1990.

These data bases illustrate a growing number of programs in a growing number of states, an increase in permanent programs, and in specialty programs - (used oil, household batteries, and paint only, even curb side collection of limited specific items).

Permanent programs continue to be established at a rapid rate. Figure IV shows the number of permanent programs per year and Figure V shows the number per state. In 1990 55 permanent programs were in existence.

Certain trends were observed:

(1) An increased awareness of the impact of the issue.

Throughout the country, the impact of HHW began to be increasingly accounted for in such areas as leaching, landfills, clean-ups, waste water discharges, green products, and product stewardship.

(2) Increased awareness of the issue in the media, government, and industry.

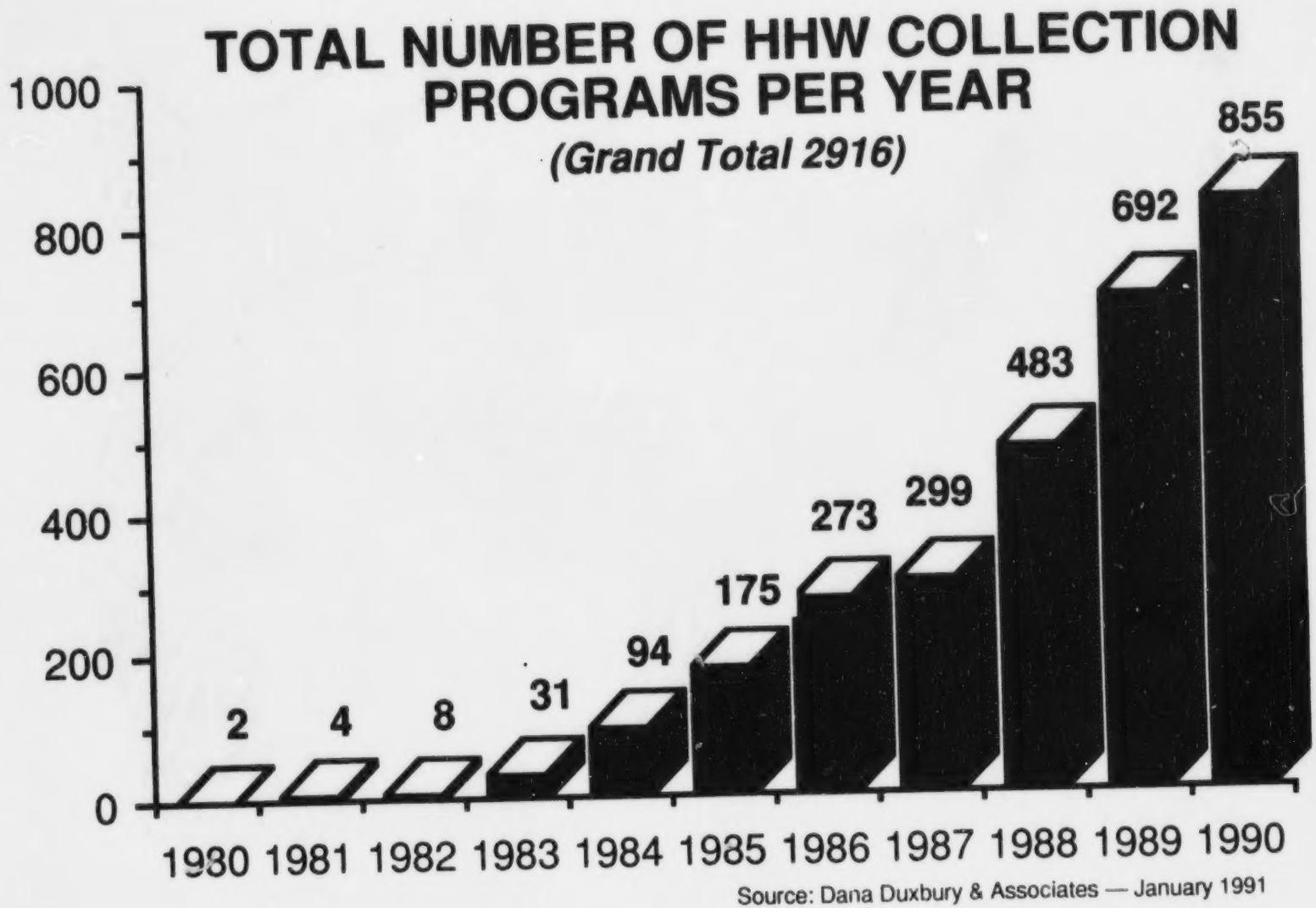
(3) Sophistication of the issue -
Public interest groups and concerned citizens have been testing products for hazardous constituents and requesting material data sheets from manufacturers. More concerns have been raised about indoor air pollution caused by volatile household products and the contribution of products with hazardous constituents to wastewater discharges both during use and disposal.

(4) Goals

Many programs are establishing goals. These goals could include the level of participation, the total of waste collected or the amount of reduction in use of products with hazardous constituents.

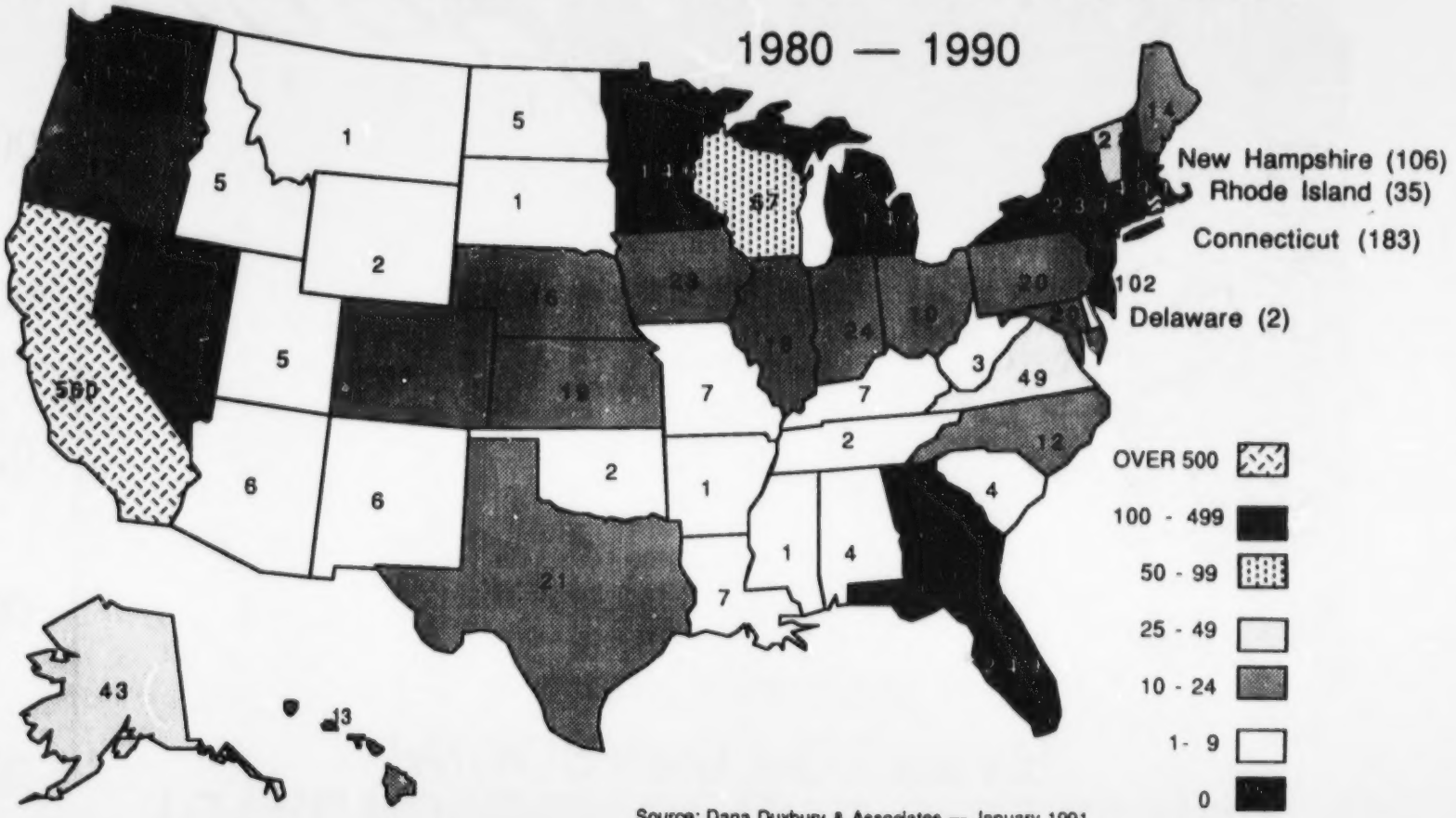
(5) State Laws

State laws are becoming increasingly sophisticated in


TOTAL NUMBER OF HHW COLLECTION PROGRAMS PER YEAR
(Grand Total 2916)
1000
800
600
400
200
0
2
4
8
31
94
175
273
299
483
692
855
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Source: Dana Duxbury & Associates — January 1991

STATES WHICH HAVE HELD HHW COLLECTION PROGRAMS

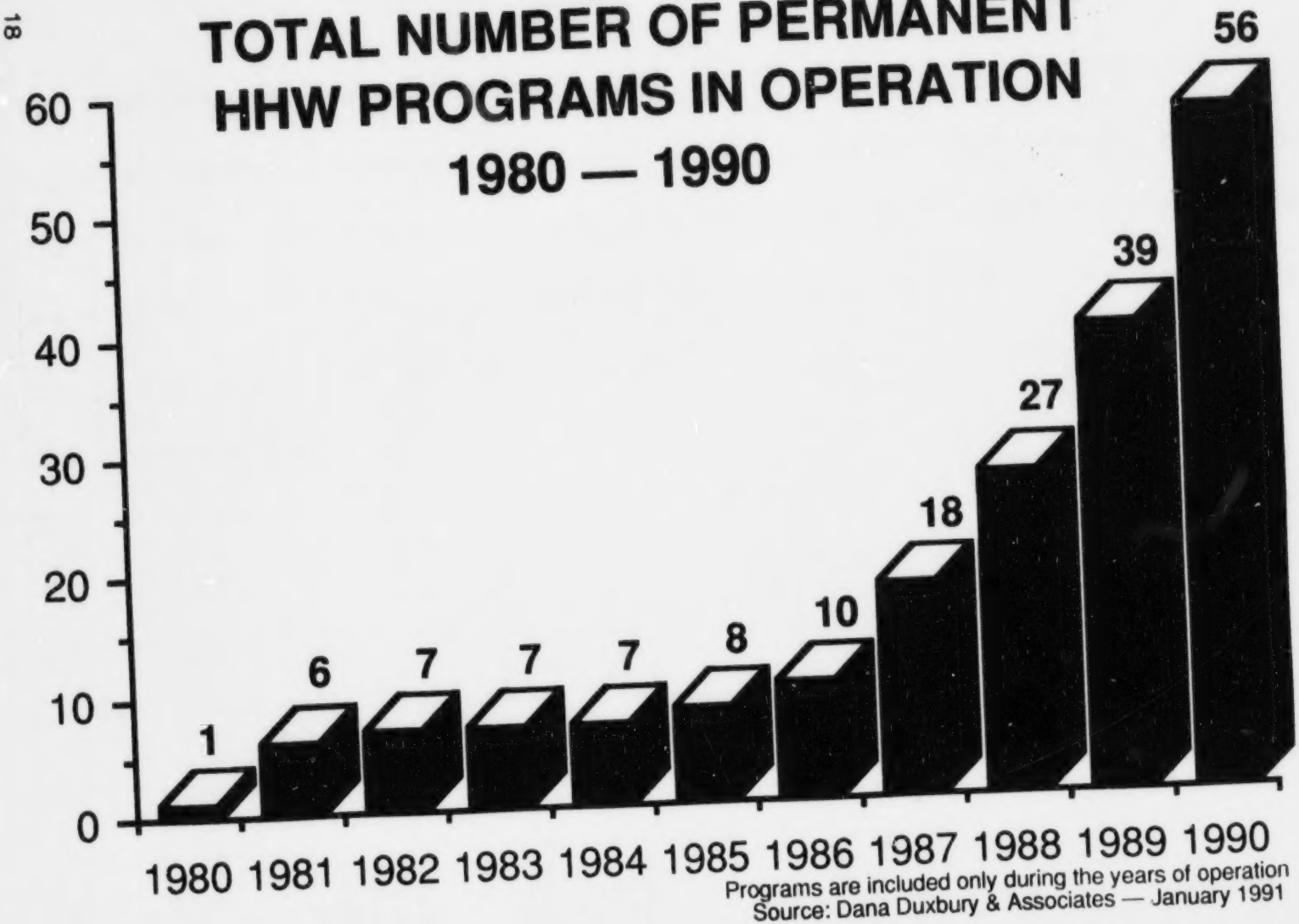
1980 — 1990



Source: Dana Duxbury & Associates — January 1991

	HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS TOTALED BY YEAR											
State	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
Alabama						1				1	2	4
Alaska				2	3	4	7	2	6	10	9	43
Arizona								1	1	2	3	7
Arkansas								1				1
California			1	5	12	37	28	81	99	114	183	560
Colorado					4	1				3	3	11
Connecticut					1	9	25	24	38	37	49	183
Delaware								1			1	2
Florida					21	22	16	13	18	72	87	249
Georgia												0
Hawaii							1	1	2	9		13
Idaho										2	3	5
Illinois								1	6	1	10	18
Indiana						2	1	2	5	4	10	24
Iowa							2		3	12	6	23
Kansas							3				16	19
Kentucky		2		1							4	7
Louisiana						1	1	1	2	2	2	9
Maine			1		2		1		1	3	6	14
Maryland						1		2	3	5	9	20
Massachusetts			1	14	30	33	78	51	101	102	81	491
Michigan					2	8	14	11	23	30	54	142
Minnesota						7	10	9	33	56	31	146
Mississippi										1		1
Missouri									1	1	5	7
Montana					1							1
Nebraska						3		1	3	3	6	16
Nevada												0
New Hampshire					1	4	11	21	19	27	23	106
New Jersey						8	7	3	13	33	38	102
New Mexico						1				3	2	6
New York			1	4	2	8	21	28	44	61	70	239
North Carolina						2				4	6	12
North Dakota	1				1				1	1	1	5
Ohio					2		1		1	2	4	10
Oklahoma										1	1	2
Oregon			1	1	1		2	2	3	3	6	19
Pennsylvania						1	1	2	5	6	5	20
Rhode Island					5	4	4	7	5	5	5	35
South Carolina									1		3	4
South Dakota							1					1
Tennessee							1				1	2
Texas							6	2	5	3	5	21
Utah							2			1	2	5
Vermont					1	2	5	3	2	6	9	28
Virginia						1	3	7	15	10	13	49
Washington	1	2	3	4	3	8	12	12	17	37	63	162
West Virginia						1		1			1	3
Wisconsin					2	6	9	9	7	18	16	67
Wyoming										1	1	2
Total/Year	2	4	8	31	94	175	273	299	483	692	855	2916
Total States	2	2	6	7	18	25	28	28	31	39	42	48
								Source: Dana Duxbury & Associates - January 1991				

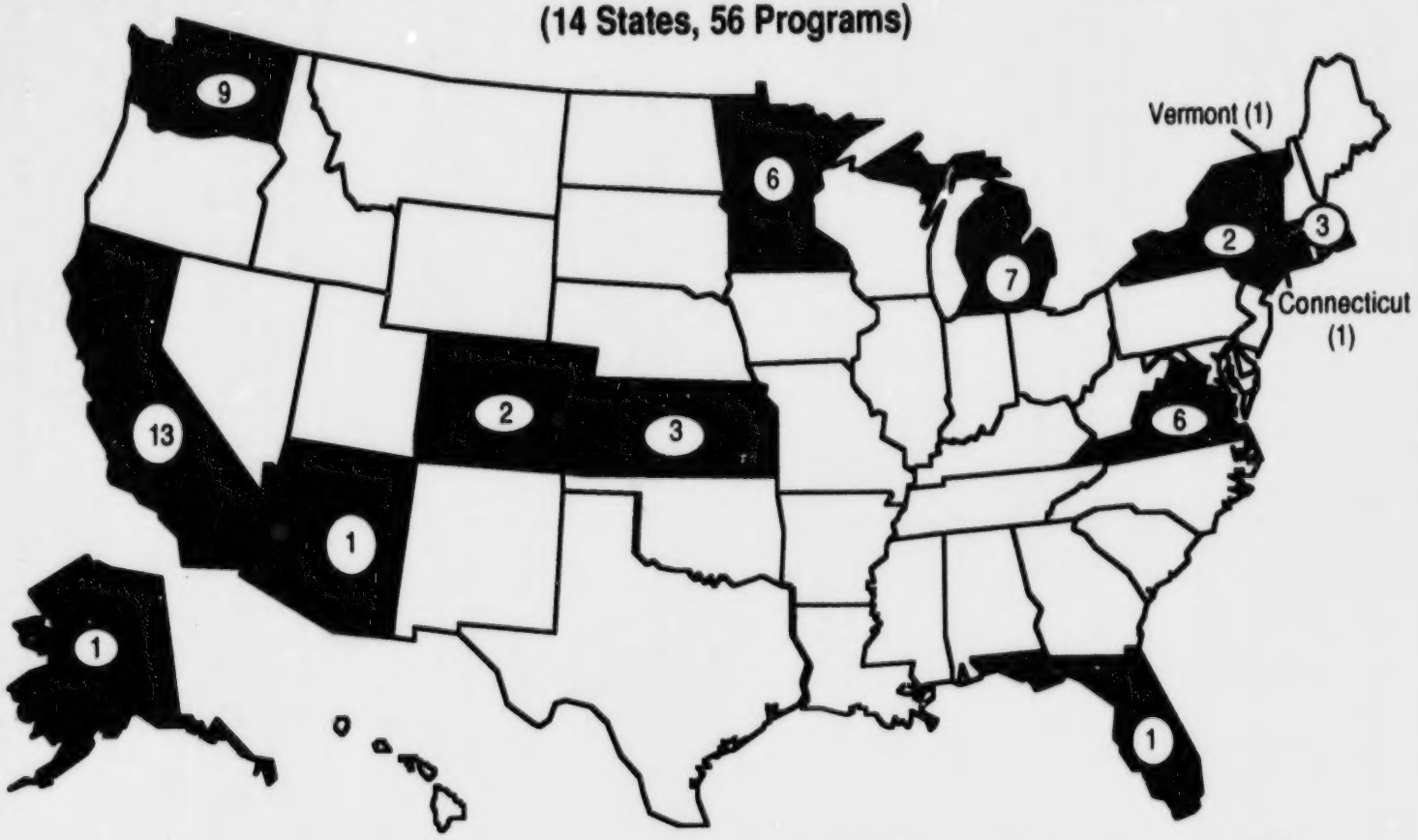
TOTAL NUMBER OF PERMANENT HHW PROGRAMS IN OPERATION 1980 — 1990



Programs are included only during the years of operation
Source: Dana Duxbury & Associates — January 1991

STATES WITH PERMANENT HHW PROGRAMS IN 1990

(14 States, 56 Programs)



Source: Dana Duxbury & Associates, January 1991

addressing specific types of HHW - such as car batteries, and household batteries.

(6) Complexity of the issue

A. No simple terms
No longer can we use the term "paint". We must distinguish between solvent based paint and latex paint, or "batteries" we must distinguish between car and household batteries.

B. Finding new problems
During 1990, the EPA banned mercury from indoor latex paint, bringing to the public's attention that approximately 20% of indoor latex had mercury as a preservative. Some outdoor latex also contains mercury as an antimildewicide.

C. Refined Waste Management Practices
EPA proposed a 25% recycling rate for new incinerators, that car batteries be excluded from being put into an incinerator and that a household battery collection program be established. (Note: Subsequently, none of these practices were mandated.)

D. Liability Clarification
EPA announced a municipal settlement policy which stated what the EPA would do in cases where municipalities took HHW to a RCRA Subtitle C (hazardous waste treatment or landfill) which ended up on the superfund list. The policy states that EPA would not list the community (or sponsor) of an HHW program as a potentially responsible party for clean up costs.

(8) The newsletter "Household Hazardous Waste Management News" is now sent to nearly 7000 individuals.

Where are we headed ?

It appears that we are now targeting particular chemicals or hazardous constituents of concerns such as lead and mercury for special attention. In some cases, EPA is seeking to ban the use of a substance, or the use of the substance in a particular use or banning it from a particular waste management option.

We are also seeking more accurate or detailed information about the constituents of a product or the sources of a particular substance in wastewater, leachate, or as an air pollutant.

Many programs are seeking to evaluate their effectiveness and others are seeking innovative or additional funding sources.

Setting Goals, Evaluating Progress

by

David V. Galvin
Senior Water Quality Planner
Municipality of Metropolitan Seattle (Metro)
Seattle, Washington

There is much activity today related to household hazardous waste (HHW) management. But where is it all going? Why are we doing all these collection programs and educational efforts? What do we hope to attain? How will we know when we have gotten there?

I hope to set a general perspective or context for HHW activities in planning terms, with particular focus on two key elements in planning that are often overlooked: goal setting and evaluation.

There are many ways to describe the key steps in planning. I suggest six, as follows:

- analyze the present situation,
- develop assumptions,
- establish goals and objectives,
- develop alternatives,
- make and implement the decision,
- evaluate and provide feedback.

My focus today is on steps three and six, which I would like to discuss as they relate to all of our HHW management efforts.

Goal Setting

It is useful to know where our destination is when we set out driving the car (unless the act of driving around itself is the reason for setting out). Likewise, in any program, it is essential to be clear about the "end to which effort is directed" (Webster's definition of goal) (Guralnik, 1980). Things such as vision, mission, purpose, ideals, intention, design and principles are the set from which goals are drawn.

The mission of any HHWM program is to protect public health and the environment from adverse effects resulting from improper handling and disposal of HHW. Goals are the markers or aims in the future that we point our activities toward reaching. They should be ambitious and challenging. They should be a source of inspiration to rise to the challenge. The lower you set your sights, the less you will accomplish.

Some examples from solid waste management may be illustrative. In 1988 the U.S. EPA set a five-year solid

waste goal to reach 25 percent source reduction/recycling nationwide (U.S. EPA, 1989). There has been lots of debate as to the achievability of this goal, especially as 1992 fast approaches. Still, it has helped to focus energies. My home town, the City of Seattle, was already at 25 percent in 1988 and so set for itself a ten-year goal of 60 percent source reduction/recycling by 1998, with interim goals of 40 percent by 1991 and 50 percent by 1993. King County (metropolitan Seattle) estimated that it already reduced or recycled 18 percent in 1988 and set a 12-year goal of 65 percent by 2000, with interim goals of 35 percent by 1992 and 50 percent by 1995. In both local cases there has been much debate about achievability, but also much progress and excitement as programs move forward ambitiously to address the challenges.

For HHW, I offer my own local experience from our recent planning efforts that have resulted in the Local Hazardous Waste Management Plan for Seattle-King County (King County et al., 1989). This plan sets a very ambitious goal: to divert all HHW from (leaving only "negligible" amounts in) the municipal solid and liquid waste streams within 12 years. Going back to the planning steps, we first analyzed the current situation and estimated that over 6,000 tons of HHW are generated in the Seattle-King County area each year (population of 1.4 million people); of that amount, our existing programs are collecting about 700 tons (500 of which are used motor oil). We developed assumptions and projections into the future: if we do nothing, the annual generation of HHW will increase to 8,000 tons in ten years and 11,000 tons in 20 years, based simply on population growth.

We then made projections for reduction of HHW, by seven waste categories, as shown in Table 1. Admittedly they are wild assumptions, but we tried by "best professional judgement" with a large element of wishful thinking to project what could be the ultimate reduction possible in various waste streams if one did the best education and incentive programs in the world and almost everyone participated. We then built our collection program around the remaining HHW that would still be produced year by year. The composite is shown in Figure 1. As this graph illustrates, even with the most ambitious and successful education program possible, there will still be a lot of HHW out there needing safe collection and handling. The often expressed view that if our educational efforts are successful we will put our collection programs out of business is a myth, at least according to our planning projections in Seattle.

In summary, HHW management program goals should:

- be clearly stated,
- be ambitious and challenging,

SEATTLE-KING COUNTY PLAN REDUCTION GOALS FOR HHW

Waste type	1991	1995	2000	2005
Latex Paint	0%	8%	58%	73%
Oil-based Paint	0%	8%	42%	55%
Used Oil	0%	0%	0%	10%
Pesticides	0%	4%	41%	55%
Solvents	0%	0%	20%	32%
Corrosives	0%	4%	41%	55%
Aerosols	0%	4%	49%	64%

Table 1. Percent reduction projected to be possible to achieve for seven HHW categories through the educational and related programs of the Local Hazardous Waste Management Plan for Seattle-King County. (King County et al., 1989)

PROJECTIONS OF HHW MANAGEMENT

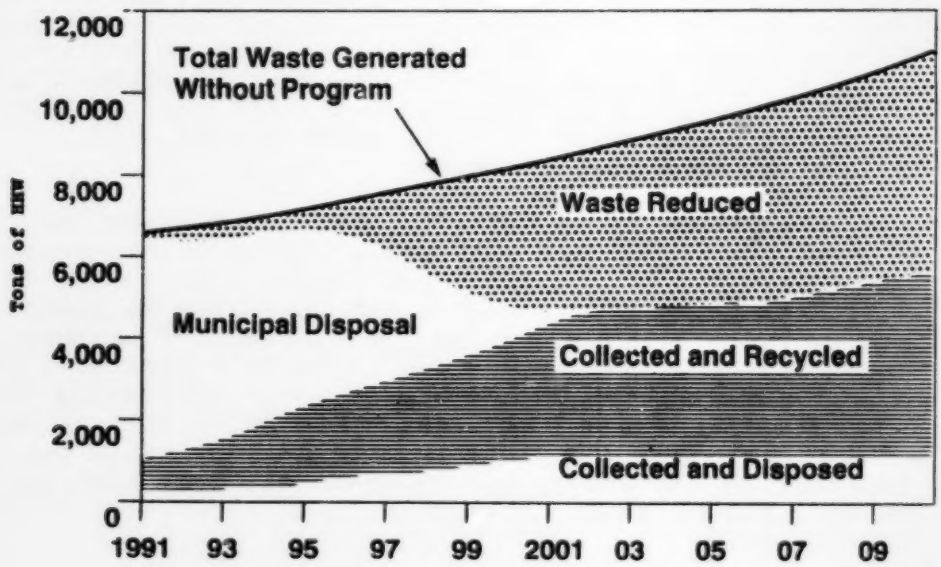


Figure 1. Projections for HHW management through waste reduction and collection programs of the Local Hazardous Waste Management Plan for Seattle-King County. (King County et al., 1989)

- emphasize source reduction, and
- strive to make significant, measurable reductions in the HHW in waste streams and the environment over the next decade.

Evaluating Progress

It doesn't do any good to set ambitious goals unless you have a way of knowing when you have achieved them or how well you are doing in relation to them. To go back to the car analogy, if the goal is to get to destination X in three hours, it helps to note milestones along the way in such terms as miles driven (percent of the total -- are we halfway there yet?); time expended (in relation to goal and to distance travelled -- are we halfway there but it has already taken two-thirds of the total time projected?); and possibly other measures such as cost, ease of travel (would an alternate route for the remainder of the distance be better?), changes in weather forecast that might cause a revision in plans, gas supply, and so on.

The past decade has seen the birth and initial development of the HHWM movement in this country. It has often been enough for a local program simply to get off the ground -- to happen as a single-day collection event, for example -- to be considered a success.

Now, however, we are entering the maturation phase of the movement. If we really want to effect change, to do something significant toward our ultimate goals, we will need to do significantly more than we currently are doing, which will take lots more money and effort on everyone's part. We will no longer be able to do this without intense scrutiny. We can no longer get away with saying, "Yes, our program is a success," without showing hard data documenting what success means.

We have reached these limits in the Seattle-King County program. Our ambitious proposal will reach into everyone's pocketbooks for a $4 million program in 1991 rising to an $8 million program in five years; it will also be reaching into everyone's lives, asking for substantial changes in behavior. We are already under scrutiny -- and will be even more in future years as the budget keeps increasing -- to show effectiveness and efficiency, to prove that we can achieve our goals, to prove in a relatively short period of time that we can effect our ultimate mission, that is, reducing the hazardous chemicals in waste streams and the environment.

But how to <u>measure</u> all of these things is difficult. It is relatively easy to measure how many cars show up at a collection site or how many drums are filled (although there is no consistency in the latter measure, and not even in the

former in terms of number of households represented). Rarely has anyone to date even taken this existing information and looked more closely at such measures as participation rate in the target population, cost per drum collected per capita served, or other variations. We should be at a point now where such collection-related figures are available to begin to scrutinize differences between different types of programs such as events versus permanent sites, and both of these versus mobile options. The national data base in so full of apples, oranges, bananas and kiwi fruits that we are unable to use it to begin these comparisons. We need to develop and agree to some format for consistent data collection and reporting. We may have lots of disagreements in the details here, but we need to work them out and come up with ways to document effectiveness and efficiencies.

And what about the less tangible parts of programs? How do we measure waste reduction, the effectiveness of our educational efforts? This is an area we really need to put our collective thinking caps on to address. We could do surveys to measure changes in awareness. Two such surveys in Seattle (Zehner, 1988) and Champaign, Illinois, (Liebert, 1989) showed 26 percent and 20 percent increases, respectively, in the general public's awareness of HHW after publicity surrounding collection events. These kinds of measures need much greater attention.

But awareness by itself won't be enough. We have to find ways to measure behavior changes, for example, changes in purchases of products, changes in what and how much gets disposed, and other real measures of action.

We are trying to address these issues in the Seattle-King County program and will be spending hundreds of thousands of dollars per year in measuring and analyzing these items in order to assess how we are doing and how well we are meeting our goals. It won't be easy. But it will be essential to continue to make progress, keep support for the program and measure success.

Ir summary, evaluation efforts should be two tiered. First, evaluation of individual programs should measure such things as:

- progress in relation to goals,
- amount of waste collected,
- participation relative to population served,
- awareness and behavior changes,
- cost and cost per result ("effectiveness").

Second, evaluation of multiple programs should compare and contrast different strategies to measure such things as:

- relative participation rates,
- relative costs,

- range of costs per unit of waste collected or reduced, all of the above toward
- identification of most effective program components.

Summary

In summary of my remarks today, I think every HHW management program should:

- set ambitious goals,
- measure progress and effectiveness, and
- feed these measures back to the program to make it better.

And overall, THINK BIG! If we are really going to make a difference with our HHWM programs, we have to be ambitious and we have to be able to show that the programs are doing the job. That won't be easy nor will it be cheap, but I believe the public is both ready to support programs that will make a difference and not willing to stand for anything less.

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Integrating HHWM with Solid and Wastewater Management

By Dana Duxbury

Many communities have begun to integrate HHW with solid waste collection. Many of the goals of the comprehensive solid waste program can be met by helping to establish and implement a HHW program. You want to integrate HHW with solid waste.

In the past solid waste reduction has concentrated on source reduction of volume, but we need to insert a toxicity reduction component. We must insure that the public knows which products contain hazardous constituents, know why they should be concerned about use, storage, and disposal of these products and that they be given information about how to accomplish this.

Composting programs — as more and more communities look into this— have great concern about usability of the compost if it has toxic components. Recycling programs can readily have HHW programs incorporated either at dropoff centers or curbside programs. Incineration also has serious need to reduce toxics in residues and emissions (especially mercury). Landfills have both emission and leachate concerns which makes it appropriate to include HHW management with landfill education and control programs.

HHW information is easily combined with overall waste management education programs — there is a receptive audience and thus the opportunity to combine the issue with solid waste and recycling education efforts. HHW can be collected curbside with general rubbish and other recyclables but there may only be certain things you want to collect curbside. Locked boxes at curbside are in use in Europe and in U.S. household batteries are left in zip-lock bags at curbside. Garbage trucks have been retrofit for used oil collection.

There are limits to what can be collected curbside because of liability and incompatibility issues. Sturbridge, MA, has combined multiple recycling and HHW stops — drop off rubbish first and then drop off recyclables and HHW and multiple stops — at the town landfill. There clearly are numerous ways to combine HHW management with solid waste management.

Integrating Household Hazardous Waste Management with Wastewater Management

by

David V. Galvin
Senior Water Quality Planner
Municipality of Metropolitan Seattle (Metro)
Seattle, Washington

What is a sewer rat like me doing addressing a crowd of garbage moles like you? Well, I'm here to tell you that HHW management is as much of an issue in sewage treatment and water quality as it has been traditionally recognized as an issue in solid waste.

The few studies that have looked carefully at sources of hazardous chemicals into municipal wastewaters confirm that many are not coming from the regulated industries and that for many of these (the Clean Water Act's priority pollutants and other chemicals) the single largest source within a municipal sewerage system is residential wastewaters.

There are a number of reasons for or areas of concern regarding hazardous chemicals in wastewater. For municipal sewage collection and treatment systems, these include:

- worker safety -- the municipal workers at a treatment plant or who must enter a "person"-hole (now called a maintenance hole) are routinely exposed to hazardous fumes; it is important that these exposures be kept within acceptable concentration levels by avoiding concentrated discharges into the sewer;

- facility integrity -- sewers and related facilities have blown up or been severely corroded as a result of discharges of hazardous chemicals in the wastewater; examples exist where these accidents have happened in residential areas or as a result of residential sources;

- plant performance -- the beneficial bacteria in a treatment plant can be affected adversely by hazardous chemicals; both in the secondary treatment process and in the sludge digestion process, high concentrations of harmful chemicals can slow down or stop biological treatment;

- effluent quality -- the water discharged from a treatment plant must meet strict permit limits, often both for concentration and for loading of chemicals into the environment; the more that goes into the sewage from residential as well as other sources, the more must either be removed during treatment or left in to be discharged into the environment;

• sludge quality -- most of the larger or heavier chemicals that are removed from the water during sewage treatment don't magically disappear, they end up in the solids left over from the treatment processes; this sludge then must be dealt with, too, often as a soil amendment or fertilizer; the levels of hazardous chemicals must be kept to a minimum;

• air emissions -- the other avenue for chemicals that don't magically disappear during sewage treatment is the air; lighter chemicals are volatilized or blown off into the air; municipal treatment plants are coming under new scrutiny as potential sources of volatile organic carbon (VOC) in areas with air pollution problems; domestic wastewaters are a major source of VOC compounds within sewerage systems;

• combined sewer overflows -- many older cities have sewers that combine sanitary wastewaters and stormwater runoff in the same pipes; during heavy rains these systems overflow untreated sewage and stormwater into the environment; any residential hazardous chemicals go untreated out the overflow with the other wastes;

• customer awareness -- an out-of-sight-out-of-mind mentality contributes to problems in the areas mentioned above; the more people are aware of their actions and potential effects and the more they make conscious decisions about what goes down the drain, the better the quality of the wastewater; also, the more supportive customers become about the importance of a good, well run sewerage system;

• water conservation -- on a similar note, aware citizens will help reduce unnecessary flows into the sewerage system; HHW campaigns complement water conservation efforts in terms of raising peoples' consciousness about what goes down the drain and the importance of making decisions about quantities as well as qualities of waste.

Fully one-third of all American households use on-site sewage treatment systems -- septic tanks, cesspools, mounds or other alternative systems. The concentration of such systems is much higher in some parts of the country. Wherever they are employed, concerns for hazardous chemicals include many of the same as above; important points include:

• system performance -- septic tanks are not designed to treat hazardous chemicals; the beneficial bacteria that break down human organic wastes can be easily disturbed and even completely killed off, thus reducing or eliminating the effectiveness of the sewage treatment;

- effluent quality -- the drain fields attached to septic tanks discharge effluent through the soil and into groundwater; any hazardous chemicals in the effluent that are not bound up in soil will thus enter the nearby groundwater; this is of particular concern in the many rural areas where on-site systems and single-home drinking water wells are in the same vicinity;

- septage quality -- the solids that settle out in a septic tank, called septage, must periodically be pumped out and disposed of elsewhere; many hazardous chemicals concentrate in the septage and have been found to contaminate septage lagoons or the municipal treatments plants where septage is handled;

- owner awareness -- a surprising number of homeowners do not even know they have a septic tank or are grossly unaware of the proper care these on-site systems require; awareness about proper management practices can logically include avoidance of HHW down the drain;

- water conservation -- as in the municipal connection, on-site water use minimization goes hand-in-hand with proper HHW management; aware on-site system users will make conscious decisions about the quality of what goes down the drain as well as the quantity.

In summary, whether dealing with an on-site system, a small municipal treatment plant or one of the huge urban sewerage systems, residential wastewaters and the consumer products they contain contribute to the load of chemicals needing to be treated. Every effort to minimize the entry of hazardous chemicals into residential wastewaters will help to reduce problems in these waste management systems and reduce the ultimate levels of hazardous chemicals in the environment.

Ass. Prof. Dr. G. Vogel[1]

European Household Hazardous Waste Management Activities[2]

1. The marginal conditions for waste management activities in Europe

The most important marginal conditions for waste mangement activities in Europe are principally everywhere the same:

- regional scarcity of landfills
- the new ecologic public awareness, mainly among "green groups", which supported by mass media have a very effective catalysing function in favor of ecologically orientated waste management. This renders it more and more difficult to build new facilities for waste treatment.

Following this trend, management plans can only be established in cooperation with the public and in an integrated way, i.e. all methods especiallly methods to avoid household hazardous waste and procedures of waste management have to be incorporated.

The most important arguments to be considered in this context are:

(1) Waste is detrimental to the environment and thus to the vital needs of men.

This argument especially applies to

- substances in products, that are toxic for man and the environment in general
- the uncontrolled disposal of hazardous and household hazardous waste
- the uncontrolled dumping of waste
- the composting of mixed waste
- obsolete incineration plants

In the future we will not be allowed to release toxic materials to the ecologic system, i.e. disposal systems have to be designed in such a way that only inert materials are disposed any more.

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2 Lecture on: U.S. EPA Household Hazardous Waste Mangement Conference, November 1990, San Francisco, CA.

(2) Waste is a consequence of wasting resources

Especially industrialized nations definitely tend to waste resources. The trend towards "throw-away products" does stimulate the economy and improves material wealth, however, the consequences - environmental pollution and the constant growth of waste mountains - cannot be denied. The people in industrialized nations bear a special responsibility, since they consume at least 80% of all resources per year and generate thus a minimum of 60% of global environmental pollution.

Waste avoidance in general is the most important instrument of waste management, but especially in the industrialized world.

(3) Waste is raw material in the wrong place

In the ecologic system a permanent recycling of substantial resources is taking place. A prerequisite is the total decomposition of organic compounds, i.e. biologic degradation. Our system of production and consumption is not adjusted to degradation. For thousands of years we have left our residuals undecomposed. With increasing wealth and population we are reaching the limits of our system.

Systems that want to survive will have to focus especially on decomposition and recycling.

The prerequisite for closing the cycles is appropriate

- product design and
- resource oriented identification of quality requirements

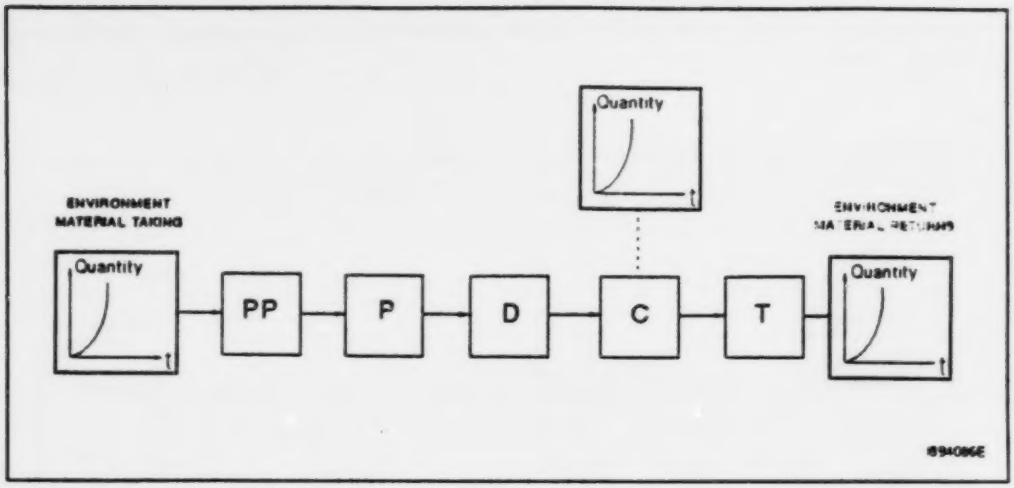
Only products with a higher share of secondary raw materials allow the desired cycling of materials.

2. From Throughput Economy to Cycling Economy

The present shaping of economic processes as a throughput economy involves the danger of an ecologic collapse. The exponential release of contaminants into the environment endanger especially regional ecosystems.

Recycling alone is not enough. If the exponential trend of consumer goods consumption continues to increase as before, recycling measures may delay the collapse, but will not be able to avoid it.

In our economic and social system we urgently need those feedback loops inherent in the ecologic systems. Feedback must mainly reflect the responsibility for products and activities.



PP	primary production	C	consumption
P	production	T	treatment(disposal)
D	distribution		

Fig. 1: The consequences of presently prevailing throughput economy: exponential environmental consumption and stress

For this purpose we need in our social and economic system:

1 abstention from product compounds and procedures incompatible with the ecosystem (undegradable, environmentally toxic, etc.), i.e. through traffic restrictions, prohibitions, limit value regulations

2 resource-oriented product planning and processes, such as

- long durability
- easy repair
- unit construction systems
- easy to reuse or recondition
- fit for recycling

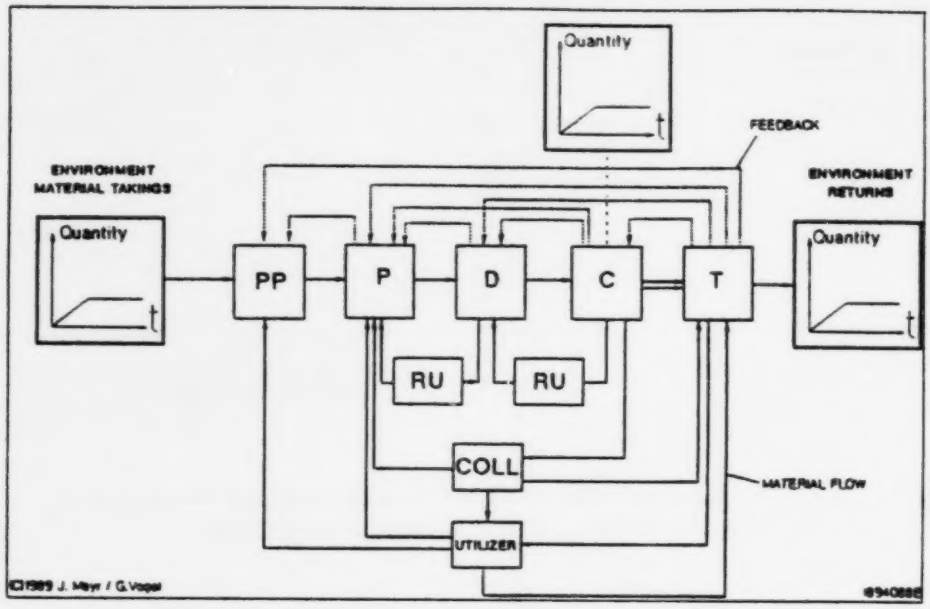
3 extension of the ecologic responsibility of producers to product residuals or secondary derelict products up to the total taking back requirement

4 the establishment of environmentally oriented product and disposal standards (clean-technologies)

5 implementation of external effects of waste disposal and of all other environmental stress by means of

- taxes
- fees
- advance waste disposal contributions
- eco-deposit models

All measures should set in prior to waste production, e.g. by means of raw material or energy taxing.



PP	primary production	C	consumption
P	production	T	treatment(disposal)
D	distribution	COL	redistribution
UTI	utilization	RU	reuse

Fig. 2: The effects of waste management on ecologically orientated economic systems

The stabilization of environmental consumption and stress suggested in Fig. 2 can only be achieved by the fast establishment of feedback loops between production, commodity distribution, consumption and disposal. If obsolete products with all their positive and negative components are returned to the responsibility of the producer, he will have to solve the problem of disposal for his product – now involved in the feedback. The present separation of responsibility for products and for disposal is one of the predominant reasons for the pending bottleneck of disposal. To this day, waste management has not been able to influence product amounts and product components and is helplessly forced to accept the generated materials for disposal. This can maximally leed to sub-optimal solutions.

3. Priorities in integrated Waste management plans and the role of household hazardous waste

In waste management, there exists a scientifically based hierarchy of methods and procedures:

1 Waste avoidance
1.1 Minimization of wasting, reduction of waste generation
1.2 Self-utilization of materials/products (further use, home composting)
1.3 Substitution of contaminants in products
1.4 Substitution of production processes, that cause hazardous wastes
1.5 Separate collection and treatment of wastes with hazardous components.

2 Reuse of products and materials (for the same purpose) by return systems, deposit systems, etc.
3 Further use of products and materials (for a different purpose)
4 Substantial utilization of secondary raw materials
4.1 Maximal recovery of utilizable secondary raw materials (e.g. waste paper)
4.2 Separate collection and utilization of biogenics (e.g. composting)
5 Thermal utilization of secondary or wastematerials by incineration and the utilization of energy
6 Rendering unutilizable residuals inert and their disposal

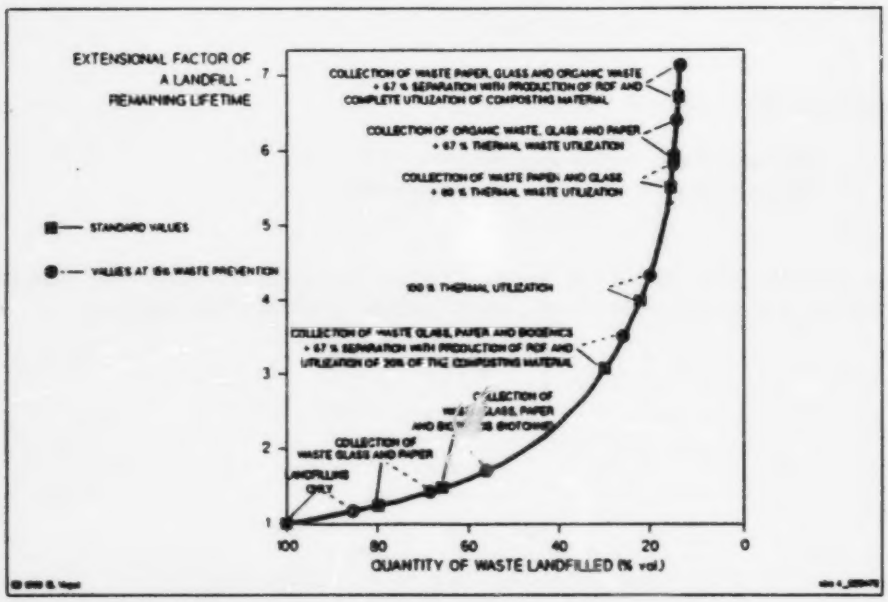

EXTENSIONAL FACTOR OF A LANDFILL - REMAINING LIFETIME
STANDARD VALUES
VALUES AT 0% WASTE PREVENTION
COLLECTION OF WASTE PAPER, GLASS AND ORGANIC WASTE + 67 % SEPARATION WITH PRODUCTION OF RDF AND COMPLETE UTILIZATION OF COMPOSTING MATERIAL
COLLECTION OF ORGANIC WASTE, GLASS AND PAPER + 67 % THERMAL WASTE UTILIZATION
COLLECTION OF WASTE PAPER AND GLASS + 60 % THERMAL WASTE UTILIZATION
100 % THERMAL UTILIZATION
COLLECTION OF WASTE GLASS, PAPER AND BIOGENICS + 67 % SEPARATION WITH PRODUCTION OF RDF AND UTILIZATION OF 20% OF THE COMPOSTING MATERIAL
COLLECTION OF WASTE GLASS AND PAPER
LANDFILLING ONLY
1
2
3
4
5
6
7
100
80
60
40
20
0
QUANTITY OF WASTE LANDFILLED (% vol.)

Fig. 3: The prolongation of the life of an existing landfill by the application of a combination of different waste management methods and procedures

Fig. 3 shows that only the combination of all methods and procedures of waste management will be able to solve the problems of landfill scarcity and abandoned sites.

If in the worst case all wastes are disposed in a mixed way and, as a consequence, the landfill has a remaining life of 10 years, this life can be doubled by separate collection of secondary and hazardous materials, by the utilization of biogenicos, and by about 15 % of waste avoidance. If thermal utilization is added to this combination, it is possible to increase the life to 70 years.

Hazardous substances in household waste are this small share of household waste due to which household waste treatment becomes difficult or certain methods of it, for example composting, impossible.

The hazardous substances in household waste are detrimental for:
- the utilization of waste materials (e.g. PCB containing carbon paper)
- waste incineration (e.g. mercury in batteries)
- the treatment of leachates from sanitary landfills (e.g. hydrocarbon from solvents)
- the landfilling of demolition waste (e.g. paintworks and solvents)

Only a combination of procedures in integrated systems allows this optimal use of resources.

4. Waste Minimization and Avoidance

Almost any activity both in human society and in nature produces more or less large amounts of waste.

Waste avoidance can only be achieved by

- less production and consumption or
- the avoidance of toxic product components.

Improvements from planning to waste disposal contribute to **waste minimization**. The change from aerosol sprays to pump sprays can be taken as an example.

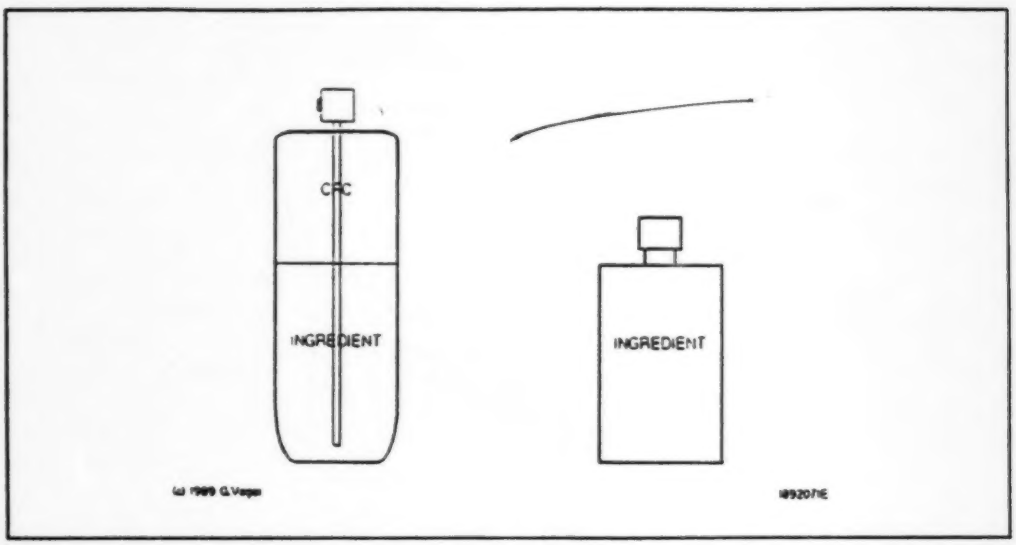


Fig. 4: Example for quantitative and qualitative waste minimization

In this example, the change from conventional products to the environmentally sound alternative saves both environmentally hazardous substances (FCC) and materials (surface) and contributes to quantitative and qualitative waste minimization.

Waste minimization and avoidance must comprise all steps of economic activity, but also of social policy, i.e. the fields of responsibility

- construction, production
- services, distribution
- consumption
- disposal

and the regulatory fields of legislation and administration have to be involved.

The instruments avaible in the field of waste minimization and disposal can be identified as follows:

- Voluntary cooperative instruments, affording a strong motivation or the threat of possible fiscal or other regulatory measures,
- Economic instruments
- Legislative (fiscal) instruments, that have to be employed, if voluntary agreements between gouvernment and economy turn out to be inefficient or are not concluded at all.

Information and motivation are especially important for the successful cooperation of all instruments and therefore comprise all other measures. On a long term basis, selfregulatory mechanisms of waste minimization and avoidance shall be introduced in all phases of the economic and social cycle by a suitable combination of instruments.

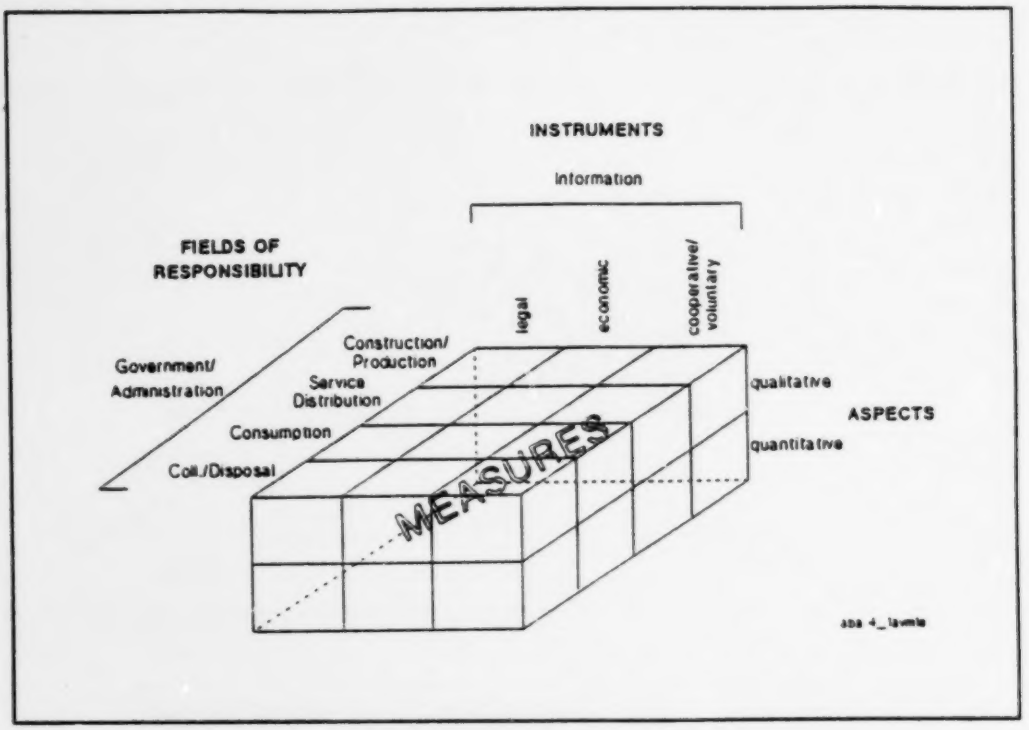


Fig. 5: The classification of necessary measures in waste minimzation and avoidance as to responsibility, instruments and aspects

5. Strategies for the minimization of hazardous substances in household waste

The strategies for the minimization of hazardous substances in household waste can be identified as follows:

- Substitution
- Low waste/non waste technologies
- Product Design
- Labelling of products and consumer information
- Economic motivation

Every individual in the chain of production and consumption is responsible for waste avoidance. Nobody must apply the NIMBY principle.
A philosphical reason for the necessity of waste avoidance is the fact that passive cleansing technologies with increasing efficiency have an exponentially increasing level of resource expenditure.

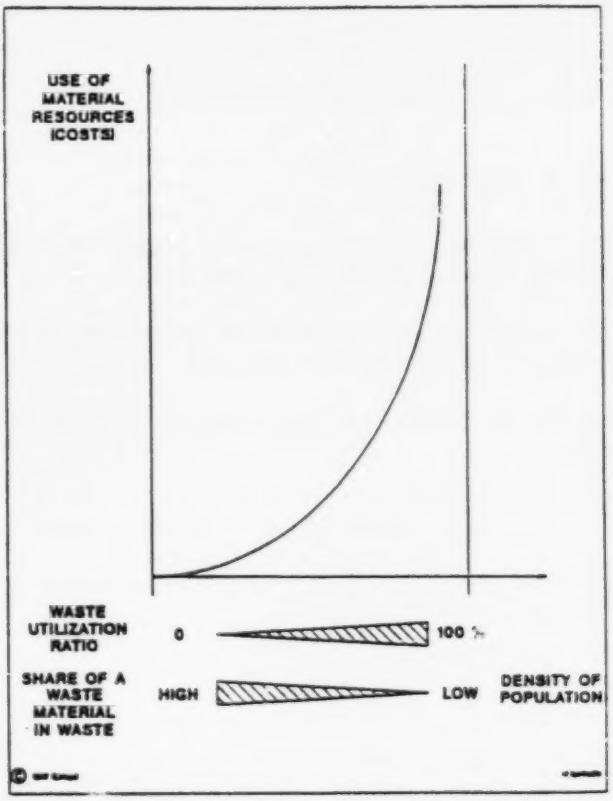


Fig. 6: Economic limits of cleansing technologies

5.1 What substances and products are considered hazardous in Europe?

Substances considered problematic comprise heavy metals – mainly cadmium, mercury, and lead – and halogenated hydrocarbons. In addition, asbestos and cyanide are being frequently identified.

Under many circumstances the general putrescible domestic waste is to be considered hazardous, bearing in mind its potential to produce landfill gas and leachates. However, leaving this aside, those substances identified as hazardous in the domestic waste stream include batteries (containing mercury and cadmium), clinical or pharmaceutical wastes, agrochemicals or fertilisers for the domestic user, waste oil form car oil engine changes, CFCs an propellants in aerosols and as coolants and insulation in domestic refrigerators and flourescent light tubes. These substances are considered hazardous if inappropriately used ie consumed in inappropriate measures, or disposed of in an inappropriate manner ie to sewer or disposed on land.

Similarly, small quantities generated by commercial concerns may well escape control through legislation or simply because quantities involved are too small or difficult to control or monitor. For example, disposal of waste oil to sewer by the car owner or small garage business is difficult to trace.

These hazardous substances either occur

- in a diffuse state in a variety of consumer products in household waste (Cd in pigments, printing inks and plastics, Cr in leather products etc.) or
- in a concentrated state in certain products (heavy metals in batteries, Cl in chlorinated solvents, FCHC in insulation foams, etc.).

The list of products stated by the member countries is headed by batteries, both button cells and consumer batteries.

	Austria	France	Italy	Nether-lands	Sweden	United Kingdom
Heavy Metals				o		
Pb	o	o			o	o
Cd	o	o				
Zn	o					
Ni	o					
Cr(VI)	o					
Hg	o	o	o	o	o	o
Hydrocarbons						
PCB	+			o	+	
(F)CHC	+			o	+	o
DDT					+	
PVC						
Polyethyleneglycol						
Butane						
Asbestos				o		
Cyanide				o		

+ Yes, by law
o Yes, by general agreement
- No

Tab. 1: Problem Substances in the Household Waste

	Austria	France	Italy	Nether-lands	Sweden	United Kingdom
Batteries	+	o	+	o	o	o
Car batteries		o				
Solvents, lacquers, paints, glues	+	o		o		
Degreasing agents						
Bleach/chlorinated						
Photo chemicals	+			o		
Pigments	o					
UV-Stabilizers	o					
Pesticides, herbicides	+	+				o
Household cleaners						
Personal care						
Automotive products						
Waste Oil	+	o		+		o
Medicines	+		+	o		o
Hg-Thermometers	+			o		
Infectious material	+					o
Waste meat						
Fluorescent tubes	+					o
Spray cans	+	o				o
Refrigerators	+					o
Insulation foams	o					
Explosives	+					
Cancerogenous wastes				+	o	
Cinder						
Sludges						

+ Yes, identified by law
o Yes, identified by general agreement
- No

Tab. 2: Problem Products and Wastes in the Household Waste

	Austria	FRG	France	Italy	Nether-lands	Sweden	United Kingdom
Waste Management Plan	[M]	M			M		
Liability	M						
Information/Media	V	V					
Education	V	V					
Brochures	V	V	V		V		
Hotlines	V	V			V		
Advisors	V	V		V	V		
Labelling	M						
Shelf labelling	V						
Product labelling	M	C			M[1]	[M/C]	V
Disposal instructions	M						
Product banning	M[3]					M[8]	(M)
Trade restrictions	M[4]		(M)[6]			M[2]	(M)
Substitution		V			C[1]		(V)/[M]
Reduction	C[1]	C[1]	V[1]	C[1]	C[1]	V	
Collection	M						
Taking back	M[4]	C/M[4]					
Separate collection	M	V	V	M[1,7]	V/M		(V)
Deposit schemes	M	M					
Pre-paid disposal fee	C[4]						
Funding	M						
Monitoring SOGs						[M]	

V	Voluntary	[1] Batteries
C	Cooperative	[2] Under the Chemical Law
M	Mandatory	[6] Under regulation for new products
( )	Partly	[7] Medicines
[ ]	Planned	[8] DDT [PCB 1994] (Cd) (Hg) [CFC 1995], canc. subst.

Tab. 3: Instruments

5.2 Collection Systems for the Separate Collection of Household Hazardous Wastes

Here a list of approved systems for a separate collection of household hazardous wastes:

- deposit schemes
- legal obligation of traders to take back goods
- community collection places which are open all the time
- voluntary take back activities of traders
- community collection places that are open periodically
- spontaneous local collection activities
- public collection containers
- additional sack systems.

The most prominent types among the variety of collection systems for household hazardous waste are:

- Separate collection at fixed collection facilities with personnel, open to the public throughout the year (occasionally combined with recycling centers)
- Public collection containers and boxes (e. g. for batteries)
- Regular collection at fixed installations, regularly opened (1 - 2 days/week)
- Regular collection at fixed installations, opened once every month
- Regular collection with mobile facilities (e. g. Chemicar [NL, A, FRG], approx. once every one or two months) at varying or fixed sites.
- Periodic collection days with mobile facilities (e. g. twice a year)
- Periodic curbside collection for all or certain kinds of household hazardous wastes (e. g. twice a year)
- Sack systems in addition to regular household garbage collection with especially equipped household waste collection vehicles.
- Bringing back systems to retailers who are legally obliged to take secondary materials back
- Voluntary and cooperative taking-back activities of retailers without legal obligation
- Spontaneous local collection or clean-up activities for all or certain kinds of household hazardous wastes
- Household hazardous waste collection upon demand (F).

	Berlin	Copen-hagen	Munich	Paris	Stock-holm	Vienna	Zurich
Permanent Coll. site	+	+	+	-	+	+	+
Regular Collections	-	-	-	-	-	+	-
Mobile Coll. Facilities	+	-	+	-	-	+	+
Public Containers	+	+	-	-	+	-	-
Drugs: Drugstores	-	-	-		+	+	+
Batteries: Commerce		-	+	+		+	+

Legend: + Yes - No

Tab. 4: Collection systems for hazardous materials in European Cities

The activities can be supported by:

- Information / public education / motivation campaigns
- Economic incentives (deposit schemes, price-included disposal fee, waste tax)
- Mandatory participation
- Public funding / sponsoring
- Research and studies

5.3 Collection Results

Collection results strongly depend on the organization of the collection and the convenience involved for the population:

The composition of collected hazardous substances is largely dependent on the choice of a collection system.

Sporadic collection activities with large intermissions will only bring toxic substances which people would store over longer periods, such as remainders of paints, laquers, or medication, whereas substances such as motor oil or edible oil will come in small quantities only.

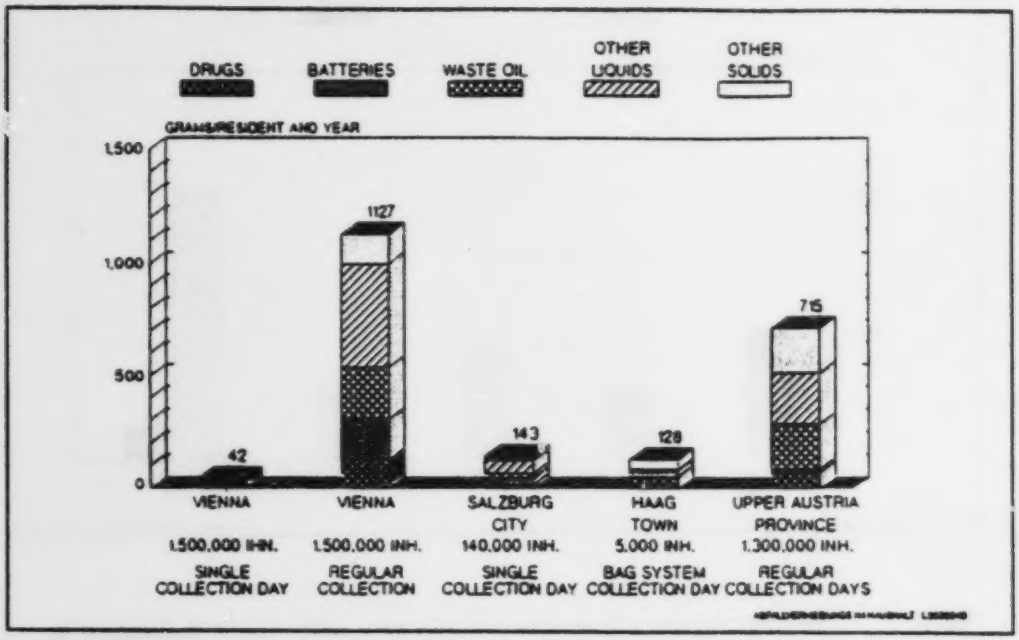


Fig. 7: **The interdependence of collection results and the convenience of collection systems**

Collection system	Kilogram/inhabitant.year
Collection places open weekly	
high density	0,80 – 1,40
low density	0,12 – 0,24
sack system	0,14
singular collection day	0,03 – 0,11

Tab. 5: **Comparison of collection results, achieved with different hazardous waste collection systems (kg/inhabitant.year)**

Though separate collection of hazardous waste is a merely passive measure for environmental protection, it is, compared to substitution, quickly realizable and a first step in reducing environmental stress. Furthermore, it enhances consumer behaviour and public awareness.

The costs of household hazardous waste collection can be described as follows:

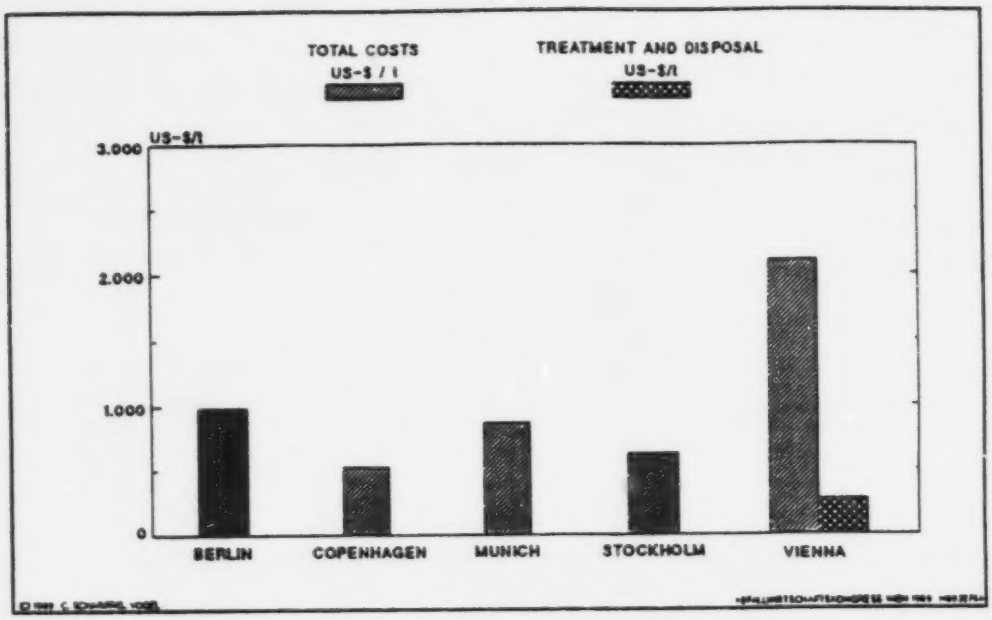


Fig. 8: **The costs of household hazardous waste collection and disposal (in $/ton)**

As to population density and collection costs, investigations in Austria have shown that even with rather similar specific collection results in rural and urban areas, the costs per ton and per resident vary considerably. Data from the Netherlands support this thesis. Additional data from other countries would be useful.

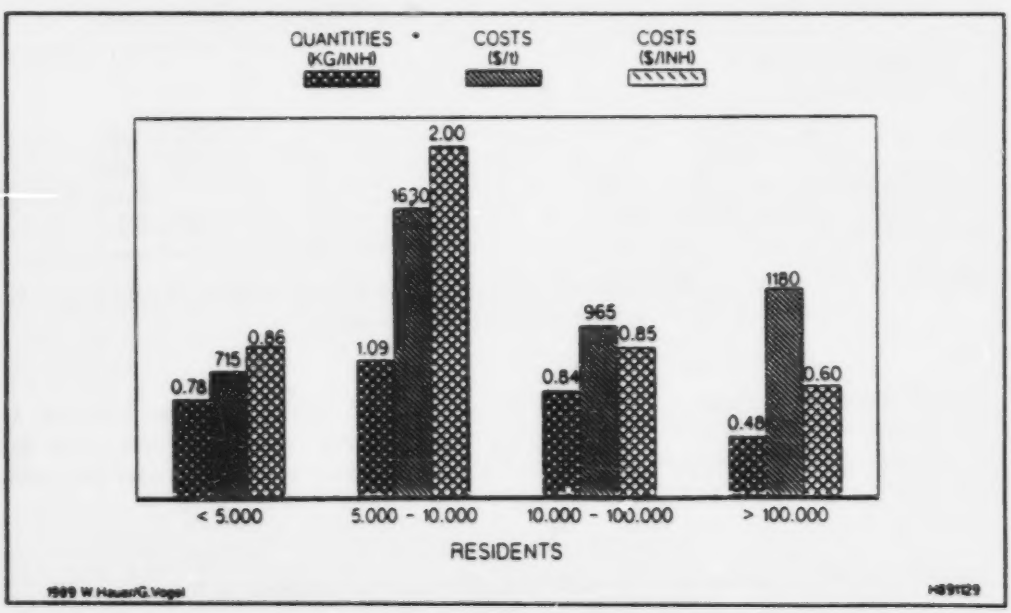


Fig. 9: **Quantities collected and specific costs of household hazardous waste collection in Austria**

5.3 Economic Motivation for separate collection of hazardous household wastes

The author holds that only the combination of ecologic and economic motivation criteria can bring about sufficiently high retrieval rates.

Example: the collection of aluminium cans in two districts in Vienna showed the following results:

	collection sites	Deposit (in cents)	Effiency (in %)
With economic incentive	3	1.8	38.2
Without economic incentive	7	0	3.1

Tab. 6: Efficiency with and without economic incentive

When applying these findings to batteries, we see that voluntary ecologically motivated retrieval of batteries can maximally achieve 20% of the total amount of batteries for utilization. The zinc-content in a compost made from household waste would drop from 1200 ppm (without retrieval) to 960 ppm (minus the above 20%).
The latest Swiss Standard, however, has established a limit value of 400 ppm, i. e. a retrieval rate of at least 65% would have to be achieved. This is only possible by an economic incentive, i.e. a deposit scheme.

For the combined solution, i.e. the high retrieval rates and the generator -based manipulation and treatment costs, the following Ecologic Deposit Scheme is suggested:

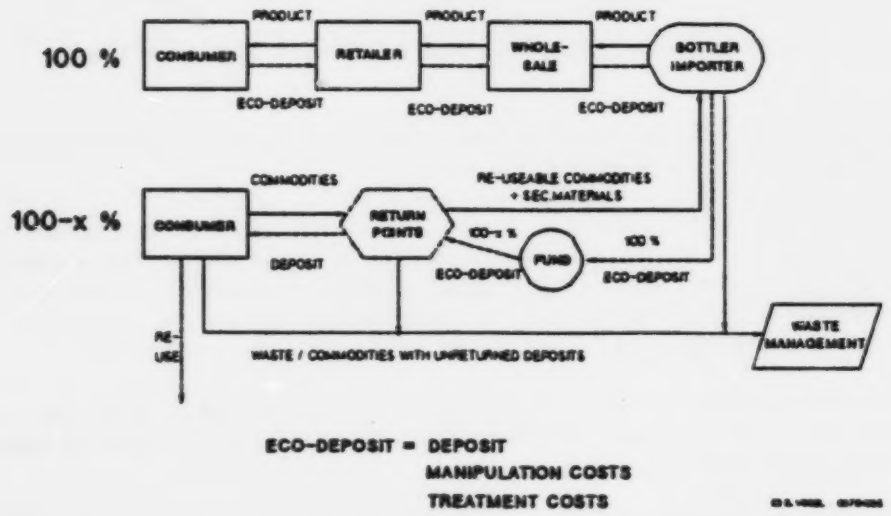


Fig. 10: The Ecologic Deposit Scheme

If, for example, the possibility of envionmentally sound product design and of the Ecologic Deposit Scheme are combined,the following reductions of the Hg content of batteries on the Austrian household waste can be obtained:

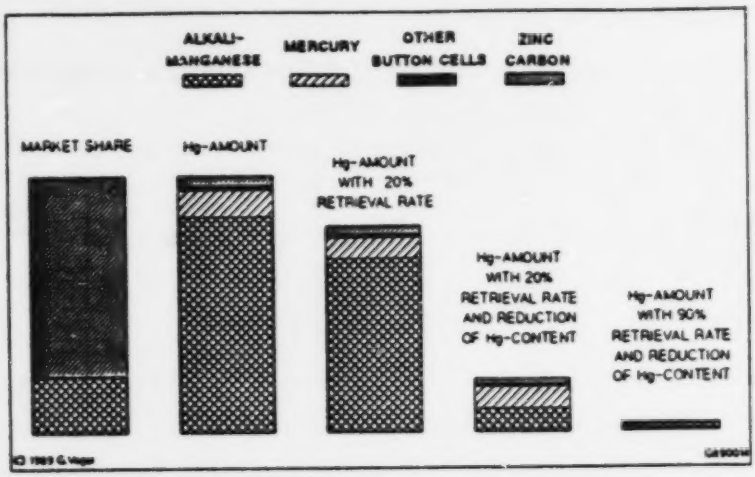


Fig. 11: Mercury in household waste (batteries) depending on product design and retrieval efficiency

6. A Selected Case Study of Household Hazardous Waste Management

- Municipal Household Hazardous Waste Collection Program of Vienna

Vienna, the capital of Austria, covers an area of 415 km^2, and has a population of 1,5 million with about 730.000 households.

By the end of 1989, 50 household hazardous waste collection points in the total municipal area were set up at much-frequented points - mostly at market places. With a staff of a chemist and an assistant, these specially equipped large containers are mostly open on Friday afternoon and Saturday morning. Additional recyling centers and mobile facilities (city busses for densely populated areas) are planned for an even better supply.

In addition, the collection of hazardous materials is further improved by cooperation with commerce: the community covers the collection costs for 112.9 t of old medicines brought back to the Vienna pharmacies.

In March 1987 an agreement was made between the City of Vienna and the Vienna Chamber of Commerce that secures waste battery collection all over Vienna: More than 800 businesses participate in this joint environmental initiative and collected 24.8 t of waste batteries. The City of Vienna is bearing treatment and disposal costs involved.

Waste analyses in Vienna have shown that about 2 - 3 kg/resident and year of household hazardous waste are generated. About 25% of that amout have been collected and treated separately in 1989. According to the results of a field test in 1985/86, a retrieval rate of about 40 - 50% is expected, when the collection system is fully established.

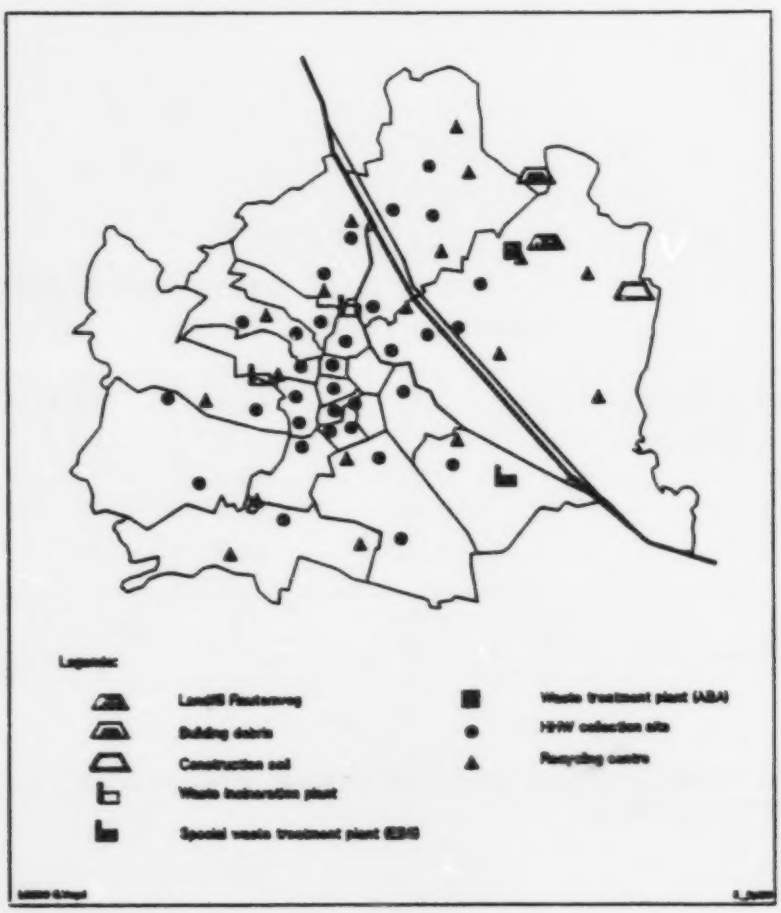
In 1989, a total of 1,316.5 t of hazardous waste were separately collected and utilized or disposed in an environmentally sound way. The largest material group were car batteries, liquid organic waste and dry cells.

375 tons (28 %) of these wastes were utilized, 738.4 tons (56 %) incinerated in the hazardous waste treatment plant Simmering and the rest of 155 tons (12 %) went to hazardous waste landfills.

Public response:

In 1989, more than 193.000 people brought household hazardous waste to the hazardous waste collection points. They represent 25 % of the Vienna households. An increase by more than 70 % has been realized in 1988 and by more than 47 % in 1989, both as to quantity and frequency.

In Vienna, we have developed as follows:



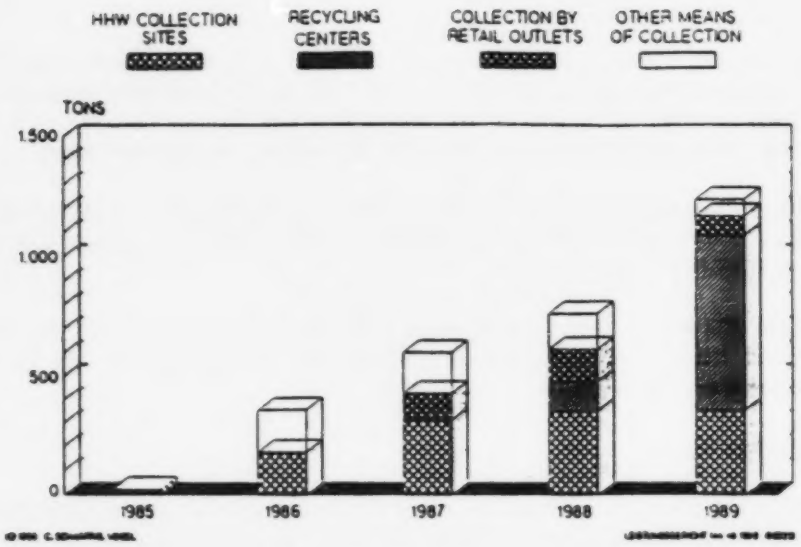


Fig. 12: **The development of household hazardous waste collection results in Vienna**

	SPECIFIC QUANTITY (LBS/INH.YEAR)	SHARE (%)	EFFICIENCY (%)
WASTE BATTERIES	0.38	15.1	55.4
WASTE DRUGS	0.30	11.9	50.0
WASTE OIL	0.52	20.6	
EDIBLE OIL	0.40	15.9	
OTHERS	0.92	36.5	
TOTAL	2.52	100.0	36.7 - 57.9

A87034

Fig. 13: **The efficiency of household hazardous waste collection in special districts in Vienna**

Collection system	tons, 1989	Treatment	tons, 1989
Hazardous waste collection points	352.9	Recyling	374.8
		Thereof:	
		Car batteries	217.6
Recycling centers	691.3	Edible oil	134.1
Mobile recycling centers	44.5	Fluorescent tubes	16.8
		Photo chemicals	4.4
Pharmacies	65.0	Wastes containing Hg	0.2
Commerce	16.8	Incineration	738.4
Local initiatives and small business	66.8	Landfilling	155.0
		Storage	48.3
Waste sorting plant	69.9		
Landfill input control	9.3		
Total	1316.5	Total	1316.5

Tab. 7: Collection results and treatment of household hazardous wastes

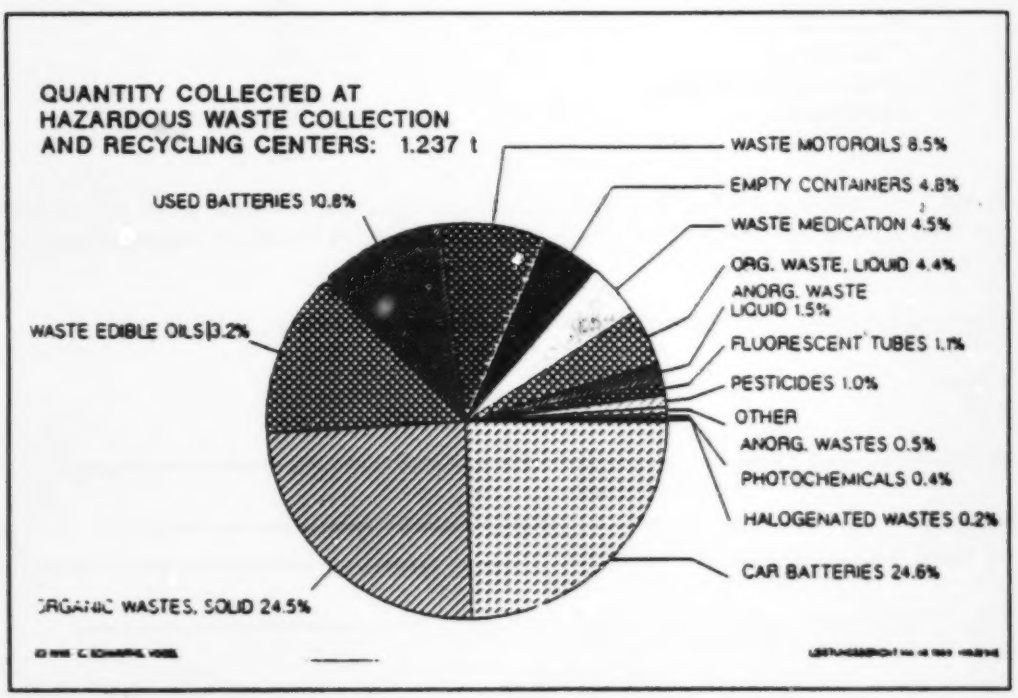


Fig. 14: Composition of collected household hazardous waste

In addition to securing hazardous substances, separate collection allows to classify them for utilization or disposal with or without pretreatment.

- for utilization (e.g. batteries containing silver or mercury, fixing solutions, edible oil, motor oil, chlorine containing solvents, car batteries, fluorescent tubes)

- for hazardous waste incineration (e.g. paints, laquers, old drugs, combustible organic toxic substances in general)

Fees:

There is no direct fee for household hazardous waste collection, the waste collection fee includes hazardous waste collection.

Costs:

The costs of household hazardous waste collection in Vienna as described above are composed of personnel costs and container depreciation, transport costs, treatment and disposal costs, and overheads.

Costs per collection facility and month (estimations in US-$ for 1989):

Container and equipment costs:	91
Personnel costs:	1.182
Transport:	727
Treatment and Disposal:	364
Overheads:	364
Total costs:	2.728

Given the average of 1.8 t of household hazardous waste per collection point and month presently collected in Vienna, the costs of one collected ton of household hazardous waste amount to about US-$ 1.500/t.

The costs for one hour of opening time of the collection point amount to US-$ 80.

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Carole Wagner Vallianos
President, League of Women Voters of California/Education Fund
Introductory Remarks to **Cleaning Up Toxics at Home**
Plenary Session Nov. 5, 1990 11:30 am

I'm delighted to be here to introduce the League of Women Voters' new television program Cleaning Up Toxics at Home.

You may be wondering how the League happens to be involved in household hazardous waste--and not just elections. Some of you know that Dana Duxbury herself is one of the people who urged leagues all over the country to be involved in household hazardous waste issues. Dana was serving on the board of the League of Women Voters of Massachusetts when a local league organized one of the very first collection programs in the country. She became concerned, urged many of us--in Leagues and in local governments--to get busy. Now, ten years later, we are all here working together to ensure that hazardous materials from households are disposed safely--or, even better, reduced.

Thanks to Dana and many other concerned League members, including California League members Judy Orttung and Joan Dotson, whom you will hear at this conference, Leagues of Women Voters all over the country have helped organize toxics roundups in their own communities. We have also studied the public policy issues of hazardous materials management and have established very strong policies that we lobby our elected officials to adopt.

We also published several reports and have done a great deal of public education about these issues, including producing several award-winning television documentaries--Toxic Chemicals: Information is the Best Defense and Can I Drink the Water? and now Cleaning Up Toxics in Business and Cleaning Up Toxics at Home. The writer, producer and League member extraordinaire who produced all of these documenaries is Nancy Bickel. She is a person of uncommon talent as you will see by the results in the documentary.

A number of people who are here today who helped us to produce these programs by giving us good advice and even appearing in the programs. Our host Jan Hutchins has been invited to speak to you tomorrow. Some helped with funding and we certainly couldn't have done it without them. A few are directly involved in waste management--like Norcal Solid Waste Systems, which got us started with a very generous grant, Appropriate Technologies/Greenfield Environmental and Pleasant Hill Bay Shore Disposal. The projection equipment we're using today was made possible by a grant from Safety Specialists. IBM San Jose, Dow Chemical, and the Clorox Company gave us generous contributions, as did several foundations and both water and waste water districts.

We produced Cleaning Up Toxics at Home because we knew citizens were concerned about toxics and we wanted to give them simple, practical tips--tips about how they could reduce their own contribution to pollution and make their families safer--by disposing and using household toxics safely and by reducing them. We hope that you will take this program home and use it. We believe it will make your jobs easier as you educate your own communities about household hazardous waste.

Cleaning Up Toxics at Home
--a new half-hour videotape from the League of Women Voters--gives citizens simple and practical tips on what each of us can do to use and dispose household toxics safely. It shows how we can reduce the hazardous materials we use at home--and still keep our homes clean and pests out of our houses and gardens.

The program is divided into three segments: proper disposal, safe handling and storage and safer alternatives.

In looking at proper disposal the program visits successful community programs--a permanent collection site, a one day collection and a curbside pickup of waste oil. It emphasizes recycling of waste motor oil, reuse of latex paints in community graffiti removal programs and the secure storage of outdated pesticides until they can be properly disposed in a toxics collection program. National experts Dana Duxbury and Gina Purin--and many citizens--comment on the issues.

Safety for children and adults is emphasized in vivid demonstrations and in comments by San Diego Poison Center Director Dr. Anthony Manoguerra and California Department of Health Services expert on indoor air pollution John Girman.

The effectiveness of tools and simple materials like baking soda and mild soap to replace chemicals for household tasks from cleaning to clearing drains to dealing with pests is demonstrated by two non-toxic housecleaners and by Sheila Daar of the Bio-Integral Resource Center; Diane Takvorian of San Diego's Environmental Health Coalition also comments.

The program is available in vhs and other formats, with and without internal breaks. It is suitable for television broadcast and for use in meetings and classes from age 12 to adult. A companion program on reducing toxics in small businesses, **Cleaning Up Toxics in Business,** is also available. Tapes of the program are available from: The Video Project, 5332 College Ave., Suite 101, Oakland CA 94618; Tel:415/655-9050.

Institutions VHS Sale: each $59.95; Series Price $99.95; Individual/low income VHS Sale: each $29.95; Series $49.95; Shipping and handling charge: for 1-2 videos add $4.95 ; 3-4 videos add $8.95; 5+ videos add $12.95; in California add 7.25% sales tax. Bulk discounts available.

AN OVERVIEW OF MUNICIPAL SOLID WASTE SOURCE REDUCTION

MICHAEL P. FLYNN
Acting Chief, Waste Reduction and Management Branch
Municipal and Industrial Solid Waste Division
Office of Solid Waste, U.S. EPA

As background for this afternoon's sessions, I'd like to provide a brief overview of municipal solid waste source reduction - where we are today and our challenges for the future.

As you know, the U.S. is faced with a municipal solid waste crisis - we currently produce 180 million tons per year; this is 4 lbs of waste per person per day and growing. Coupled with this increasing amount of waste is our dwindling nationwide capacity in which to dispose of this waste. Therefore, a critical first step to addressing our solid waste problem is source reduction - reducing the quantity and toxicity of materials that enter the municipal solid waste stream.

With regard to toxicity reduction, EPA's initial efforts have focused on lead and cadmium, which have posed problems for the management of ash from municipal waste combustion. In 1989, EPA issued a report (1) identifying the sources of lead and cadmium in the municipal wastestream and will soon publish an analysis of potential substitutes for lead and cadmium. In the same way, the Agency has been studying the sources of mercury in municipal solid waste and expects to issue the findings this Spring. EPA also plans to develop a strategy that sets out a priority of additional toxic compounds in municipal solid waste for future toxicity reduction work. Developing this strategy will be a key focus of EPA's municipal solid waste toxicity reduction efforts over the next year.

Let's turn our attention now to quantity reduction. Figures from EPA's recent update on the composition of municipal solid waste highlight potential targets for quantity reduction (2). For the first time, we have estimates for both weight and volume of municipal solid waste. Volume estimates are particularly important if one is concerned about conserving landfill space. Paper and yard waste (based on weight and volume) comprise very significant portions of the wastestream and thus they are good targets for quantity reduction. Plastics account for a relatively small portion (8%) of the wastestream on a weight basis, but a significantly larger portion (20%) on a volume basis. The composition of municipal solid waste is also described in terms of products. Containers and packaging account for nearly 32% by weight of the wastestream, nondurable goods comprise 28%, and yard waste accounts for 7%. While these figures highlight major targets for quantity reduction we need to

continue to search for reduction opportunities throughout all parts of the wastestream.

Everyone has a role in implementing source reduction. Product manufacturers obviously play a major role in designing less toxic products and packaging and reducing unnecessary material in products and packaging. Distributors and retailers play an important role in influencing product manufacturers as well as consumers. Finally, the consumer, whether at home or at work, and whether individual or corporate, can play a significant role in implementing source reduction through purchasing habits (e.g., buying bulk products, avoiding products with excess packaging) and by incorporating source reduction in everyday tasks (e.g., use of double-sided photocopies, use of reusable containers).

While we have made progress in implementing municipal solid waste source reduction, there are a number of difficult challenges we must tackle if source reduction is to be truly successful. First, because source reduction requires a fundamental change in behavior, we must step up our efforts to communicate the "source reduction message" to the general public. We must strive to provide clear, understandable information so the consumer can make environmentally sound purchasing decisions. Obviously, product labeling may play an important role in achieving this.

Second, we must continue to look for and establish incentives, particularly for manufacturers, to implement source reduction practices. Of particular promise is the use of economic incentives. Other options include award programs and mandatory measures.

Finally, we must resolve the technical and policy issues associated with measuring source reduction and conducting product lifecycle analyses. Our lack of effective measurement techniques for source reduction stand in the way of setting our current baseline and measuring our future progress in source reduction. Without these effective measurement tools, numerical goals for source reduction are meaningless, leaving source reduction less desirable as an option for dealing with MSW. Therefore, EPA recently initiated a project aimed at tackling this difficult issue.

In addition, we must resolve the policy and technical issues related to product lifecycle analyses, which involve evaluating the full impacts of a product or package from the point of manufacture to disposal. There are a wide range of outstanding issues related to how these analyses should be completed, the appropriate roles for these analyses, and when these analyses are

necessary. EPA has launched a major project to address these issues and develop guidance on product lifecycle analyses. This project will be described in more detail by Susan Mooney in this afternoon's session.

As we continue to refine our techniques for effectively managing household hazardous waste, we must keep our sights on the long term solution reducing both the quantity and toxicity of our wastestream. Thank you.

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Rating Safer Alternatives to Hazardous Household Chemicals—an Update

Philip Dickey, *Washington Toxics Coalition**

Last year at this conference I reported on a new project which the Washington Toxics Coalition had undertaken to rate safer alternatives to toxic or environmentally hazardous household products (Dickey, 1989). Since then we have worked hard to refine our selection criteria, set up a computer database system, and perform preliminary ratings on some 150 products. This paper will report on our progress.

Since last year the interest in "environmentally friendly" products has virtually exploded. A number of new programs to label "green" products have begun, the most visable of which are Green Cross and Green Seal, which you will be hearing about shortly. Even more noticeable, however, is the great number of new products which claim to be environmentally friendly. Formerly confined to co-ops and natural food stores, brands such as Ecover are beginning to show up in major supermarket chain stores. There are new cleaners based on citrus oils, paint strippers with water-based solvents, and pheromone traps for insects. While I applaud all of this attention to environmental concerns, I know that many consumers who want to do the right thing are completely confused.

I have spent a lot of time this year browsing store shelves, and I have identified several techniques which are being used by some to make their products appear "green." Three of these are shown in Figure 1. The first ploy, which I call "no ingredients," consists of listing in considerable detail what the product does not contain but giving no information at all on what it does contain. The second technique, "fantasy ingredients," involves giving misleading descriptions or definitions of ingredients to make them appear more benign than they actually are. Finally, when less toxic ingredients are combined with very hazardous ingredients, I call them "decoy ingredients." Consumers are susceptible to this kind of advertising, which exploits their noble motivation and lack of technical knowledge.

The Program

The Washington Toxics Coalition is ten-year old a non-profit environmental organization with about 1000 members. The project described here is a part of our household toxics education project called Home Safe Home, which was begun in 1985. An important feature of this program from its inception has been cooperation with government agencies and other environmental groups. For the purposes of the safe substitutes evaluation project, a multi-agency Technical Advisory Committee was established. The members of this committee have expertise in a broad range of issues, ranging from toxicology, wastewater treatment, and solid waste disposal to integrated pest management and public health. The members of the advisory committee are:

Martha Burke, Environmental Planner, Office for Long-range Planning
Terry Clements, Seattle-King County Health Department
Sharon Collman, PhD, entymologist, cooperative extension agent
Philip Dickey, PhD, Household Toxics Project Director, Washington Toxics Coalition
Lyn Folsom, Pretreatment Coordinator, City of Lynnwood
Dave Galvin, Senior Water Quality Planner, Metro
Jennie Goldberg, Associate Environmental Analyst, Drainage and Wastewater Utility
Chris Luboff, Environmental Analyst, Seattle Solid Waste Utility
David Monroe, MPH, PhD, independent toxicologist
Sydney Munger, Senior Water Quality Project Coordintor, Metro

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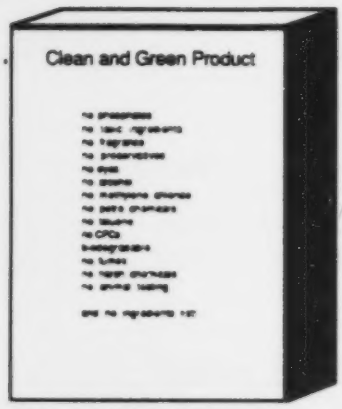
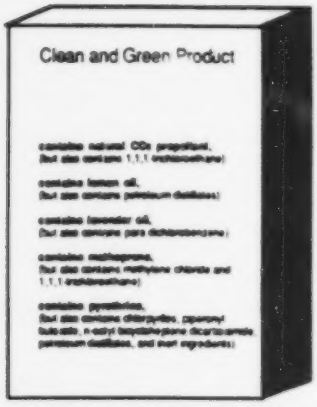
** The Washington Toxics Coalition (4516 University Way NE, Seattle, WA 98105, (206) 6321545) is a non-profit environmental organization which works in the areas of pesticide reform and hazardous waste reduction, including household hazardous waste.*

Figure 1. Green Label Tricks



NO INGREDIENTS

FANTASY INGREDIENTS



DECOY INGREDIENTS (and the fine print)

NO INGREDIENTS

- no phosphates
- no toxic ingredients
- no fragrance
- no preservatives
- no dyes
- no alcohol
- no methylene chloride
- no petrochemicals
- no toluene
- no CFCs
- no fumes
- no harsh chemicals
- no testing on animals

and

- **NO INGREDIENTS LIST!**

FANTASY INGREDIENTS

- diethanolamine: organic, colorless liquid used as emulsifier
- ethoxylate: natural salt
- ethylene oxide: found naturally in pineapples
- hydrogen peroxide: oxygen enhanced water
- hydrogen peroxide: a blend of natural and abundant hydrogen and oxygen
- organic malodor counteractant
- linear alkyl sulfonate: stable soap
- non-solvent: pre-spot with no petro chemicals
- sodium chloride: food grade organic salt
- sodium tripolyphosphate: highly refined water softening agent
- triethanolamine: natural base
- methanol: wood distillate extract

DECOY INGREDIENTS

- contains natural CO_2 propellant, but also contains 1,1,1-TCE
- contains lemon oil, but also contains pet. distillates
- contains lavender oil, but also contains para-dichlorobenzene
- contains methoprene, but also contains methylene chloride and 1,1,1-trichloroethane
- contains pyrethrin, but also contains piperonyl butoxide and chlorpyrifos

Some of the work described in this paper was performed under a contract with Metro (the Municipality of Metropolitan Seattle), the wastewater treatment utility for Seattle/King County. Other support has come from private foundations, individual donations, and sales of publications. No funding comes from manufacturers of consumer products which might be evaluated in this project. More information on this project can be found in our report to Metro (Dickey, 1990).

Products to be Considered

We are most interested in finding alternatives to products which comprise the bulk of HHW collected or which pose the greatest risk to human health or the environment. Such products include pesticides, oil-based paints, drain cleaners, oven cleaners, toilet cleaners, solvents, and other strong cleaners. Table 1 shows the types of alternative formulations we are searching for.

Table 1. Types of Safer Substitute Products

Product Category	Alternatives Considered	Do not contain
household cleaners	soaps, biodegradable detergents	petroleum-based detergents, phosphates
automatic dish detergents		phosphates, chlorine
cleansers	chlorine-free products	chlorine
oven cleaners	"no fumes" or non-caustic	lye
spot removers	non-toxic or water based	organic solvents
glass cleaners	products with vinegar	ammonia
disinfectants	products with borax, pine oil	phenols, chlorine
polishes	plant oil based	petroleum distillates
paints	latex, water based	mineral spirits
stains, varnishes	acrylic or urethane	mineral spirits
paint strippers	water based	methylene chloride, toluene,
solvents, degreasers	citrus oil	petroleum based
adhesives	water based	naphtha, toluene, styrene
inks/markers	water based	aromatic solvents
insecticides	soaps, bacterials, botanicals, growth regulators, traps	organophosphates, carbamates
herbicides	salts of fatty acids	phenoxy acids, etc.

Rating Criteria

Establishing the criteria by which to evaluate products is the most important and most difficult of a project like ours. We decided in the beginning not to attempt a so-called "cradle to grave" or life-cycle analysis. While to do so would have been desirable, we decided that is was beyond our capabilities at the time, and we did not want to delay proceeding on the rest of the criteria. Our criteria focus on the toxicity, physical/chemical, and environmental impacts of the product itself during use and disposal—we do not explicitly consider the manufacturing process. This aspect could easily be added later as a separate category of evaluation.

As described in last year's report, our criteria attempt to strike a balance between quantitative and qualitative analysis and between whole-product and individual ingredient evaluation. They consider both normal use of the product and forseeable accidents, as well as disposal.

The Rating Scheme

The general areas in which we have chosen to rate the products are as follows:

- acute (short-term) toxicity
- chronic (long-term) toxicity
- physical and chemical hazards, and
- environmental impacts.

Each product receives a rating in every category. For purposes of clarity, the ratings are represented by colors: green, yellow, red, and black, with green representing the best rating. A fifth color—gray—is used to indicate that insufficient information is available to determine a rating. The general interpretation of the colors is as follows:

Green	Generally expected to be safe.
Yellow	Product poses some risks. Use with caution.
Red	Product may be hazardous. Should be used only if safer alternatives are not available and if recommended precautions for use and disposal are followed.
Black	Product likely to pose unacceptable risk. Not recommended.
Gray	Insufficient information to evaluate.

Ratings for the four categories of product hazards are determined by looking at a number of detailed aspects or sub-categories. The basic outline of the evaluation is as follows:

Acute	Chronic	Physical/Chemical	Environmental
oral ingestion	cancer	flammability	aquatic toxicity
inhalation	reproductive	reactivity	off-target toxicity
skin	mutations		persistence
eyes	acceptable chronic intake		bioaccumulation
			breakdown products
			wastewater quality
			air pollution
			disposal

The criteria upon which the ratings are based are given in detail in the Appendix. As much as possible we have tried to use a single set of criteria for all types of chemical products. In some cases, however, particular criteria are not appropriate for certain types of products. For example, a household glue does not needed to be rated for aquatic toxicity or impacts on wastewater. To deal with this situation, we use a matrix which has product types on one axis and the environmental sub-categories on the other. A typical matrix is shown in the Appendix at the end of the criteria. Darkened boxes in the matrix indicate which criteria are applicable to each product type.

Products are rated in all applicable sub-categories. A rating for the category is then determined by taking the worst rating obtained in any sub-category. Similarly, an overall rating is determined on the basis of the worst rating in any category. Gray ratings (insufficient information) are allowed in any category or sub-category. If essential information is missing in an area deemed crucial to evaluating a product's suitability, the overall rating may also be gray.

Example: Suppose that an insecticide has the following properties.

Oral LD50 = 705 mg/kg
Skin irritation: primary irritant
Eye irritation: primary irritant
Label signal word: WARNING
Active ingredients (1%):
Inert ingredients (99%): unknown
Flash Point: 150 degrees F
Aquatic toxicity: LC50 ranging from 15-105 ppm for different species
Off target: toxic to bees and other beneficial insects
Persistence: up to 16 weeks in water, 12 weeks in soil
Breakdown products: unknown
Bioaccumulation: not thought to bioaccumulate
Water: not on EPA suspected leacher list, not a banned or restricted pesticide
Disposal: must be disposed of as a hazardous waste through HHW collection program

According to our process, the product would receive the following ratings:

Acute toxicity
Oral: Rd, Inhalation: Gy, Skin: Red, Eye: Yl
Chronic toxicity: Gy
Physical/chemical
Flam: Yl, React: Gn
Environmental:
Aquatic: Rd, Off tgt: Red, Pers: Yel, Bkdn: Gy, Bioac: Gn, Water: Rd, Disposal: Rd

Taking the worst of these ratings for each category, we find the following ratings:

Acute: Red
Chronic: Gray
P/C: Yellow
Environ: Red

The overall rating would thus be Red* (* indicates that important information is missing and that Red is the best rating this product could get. The actual rating could be lower if the inert ingredients were known.)

Rating Process

Initially we scoured store shelves and browsed catalogues to find products to evaluate. Now we get inquiries from manufacturers directly, and we are also consulted for opinions by local stores. Once a product has been selected for evaluation, we obtain copies of the product label and material safety data sheet. In most cases we contact the manufacturer directly to get more information on product ingredients or to request substantiation of claims made.

Our organization does not routinely do chemical analysis of products, although we have begun to do some trace metal assays of cleaning products. Our evaluation is based solely on information supplied by the manufacturer. Thus there is the possibility of incorrect ratings if we are supplied with inaccurate, incomplete, or misleading information. If we feel that the information supplied is not adequate, we will either give the product a gray rating or not rate it at all.

Our principal source of toxicology information is the Registry of Toxic Effects of Chemical Substances (RTECS). We access this database on-line through the National Library of Medicine's Medlars system. We also use the Hazardous Substances Databank and other databases in Toxnet for toxicology and environmental information. In addition, we some perform searches on Medline to locate articles on specific aspects. Information downloaded from these databases is stored on floppy disks, but is also printed out and kept in manilla folders, indexed by chemical. These folders also contain any other information pertaining to the chemical.

Products are rated using a worksheet . Any notes, calculations, or other information is clipped to the worksheet and kept with it in a folder for each product. Data from the worksheets is then transferred to a computer database system using FoxBASE software. With this software, data on individual products can be entered and viewed, and products can be sorted or selected according to their ratings or information on ingredients or manufacturers. When questions come up during the rating process, they can be resolved by discussion with the technical advisory committee.

So far, all of our ratings have been considered preliminary and have not been publicly circulated. We wanted to test our system by evaluating a wide range of products to see how well the criteria were able to differentiate between products with varying degrees and types of hazards. (Early test ratings forced revision of the criteria when lime juice and pinot chardonnay received black ratings for pH and reproductive effects, respectively. Under the present criteria, some brands of peanut butter would receive a black rating because of their aflotoxin content.) Before publishing lists of products, we intend to contact manufacturers to tell them how their products fared and to let them provide any information which might improve their rating. We will use that opportunity to tell manufacturers what we think of their products and to try to suggest changes in ingredients.

Sample Ratings

The criteria have been used to rate some 150 products thus far. The table below gives examples of ratings for a number of different types of products. Only the major category ratings are show; sub-category ratings have been suppressed in the interest of brevity.

Laundry Detergents	Overall	Acute	Chronic	Phys/Chem	Environ
✓ Ivory Snow	Gn*	Gn	Gy	Gn	Gn
Arm & Hammer powder	Yl	Yl	Gy	Gn	Gn
Country Safe	Yl	Yl	Yl	Gn	Yl
✓ Life Tree liquid	Yl	Yl	Gy	Gn	Gn
Arm & Hammer liquid	Rd	Yl	Rd	Gn	Yl
Bold Detergent	Rd	Yl	Gy	Gn	Rd

Dishwashing Detergents	Overall	Acute	Chronic	Phys/Chem	Environ
Electrasol (auto)	Rd	Rd	Yl	Rd	Yl
✓ Kleer II (auto)	Yl	Yl	Gy	Gn	Gn

Scouring Powders	Overall	Acute	Chronic	Phys/Chem	Environ
✓ Baking Soda	Yl	Yl	Yl	Gn	Gn
✓ Bon Ami	Yl	Yl	Yl	Gn	Gn
Ajax Cleanser	Bk	Yl	Bk	Rd	Gn

General Purpose Cleaners	Overall	Acute	Chronic	Phys/Chem	Environ
✓ Castile Soap	Gn	Gn	Gn	Gn	Gn
✓ Life Tree Home Soap	Yl	Yl	Yl	Gn	Gn
Simple Green	Yl*	Yl	Gy	Gn	Yl
Spic & Span	Rd	Rd	Gy	Gn	Yl
Household Ammonia	Bk	Bk	Rd	Rd	Yl

Oven Cleaners	Overall	Acute	Chronic	Phys/Chem	Environ
✓ Baking soda	Yl	Yl	Yl	Gn	Gn
Easy Off Non Caustic	Yl*	Yl	Gy	Gn	Gy
Easy Off regular	Bk	Bk	Gy	Gy	Rd

Drain Cleaners	Overall	Acute	Chronic	Phys/Chem	Environ
✓ Mechanical Snake	Gn	Gn	Gn	Gn	Gn
Vinegar/Baking soda	Yl	Yl	Yl	Gn	Gn
Drano crystal	Bk	Bk	Gy	Gy	Yl
Drano liquid	Bk	Bk	Gy	Rd	Yl

Pesticides	Overall	Acute	Chronic	Phys/Chem	Environ
✓ Any physical traps	Gn	Gn	Gn	Gn	Gn
✓ Safer's Soap (RTU)	Yl	Gn	Yl	Gn	Yl
✓ B.t.	Yl	Yl	Gy	Gn	Yl
✓ Rx for Fleas	Yl	Yl	Gy	Gn	Gn
Safer's Soap (EC)	Rd	Yl	Yl	Rd	Rd
Sharpshooter EC	Rd	Yl	Gy	Yl	Rd
Precor 1% EC	Rd	Rd	Rd	Yl	Rd
Precor RTU	Rd	Yl	Rd	Gn	Yl
Precor Plus Fogger	Bk	Bk	Bk	Rd	Rd
Roundup	Bk	Yl	Rd	Bn	Bk

* Indicates that a gray rating has been given in some areas. Rating is considered an upper limit.
✓ Indicates the best alternatives in a given category.

How the Ratings will be Used

The purpose of this project is to find and promote safer substitutes, not to publicly blacklist dangerous products. Our goal is to maintain a central list of alternative products which is up to date and can be searched and sorted. The information could be made available to consumers in a number of ways. One is through a consumer hotline telephone number which individuals could call to get specific questions answered. Another way would be to print and distribute lists of alternatives for different types of products. These lists could be distributed as inserts to fact sheets which the Toxics Coalition already produces. The format for the list would probably include the basic ratings as well as some sort of checklisted recommended products. The information could also be used as the basis for a shelf labeling program in stores.

Summary and Conclusions

We have established criteria for evaluating the primary health and environmental impacts of household chemical products. The evaluation procedure results in a set of ratings which can be used to rank products in a list format according to their acceptability as safer substitutes for hazardous products. Application of the criteria to actual products appears able to distribute these products along a spectrum of safety spanning the entire range of green to black ratings. The major problem with using the criteria is lack of ingredients lists for some products, particularly inert ingredients in pesticides, but also trade secret ingredients in "non-hazardous" consumer products. In such cases, these products receive gray ratings, equivalent to a non-ranking. However, products with gray ratings would not be considered as safe substitutes. Another problem is lack of good environmental fate or toxicology data on many ingredients. This is not a problem with our criteria, but rather points to a weakness in our knowledge of the indicated areas.

Consumers are expressing a desire for this type of information so that they can make environmentally sensitive decisions. Another benefit of this project is the dialog it encourages between environmental groups and product manufacturers. Already this process has resulted in several changes in product labels and formulations.

References

Dickey, P. 1989. Evaluating commercial alternatiaves to hazardous household chemicals. Proceedings of the Fourth National Conference on Household Waste Management. Orlando, Fl. November 6-8, 1989.

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Appendix

Criteria for Evaluating Household Products

Introduction

Household products are rated in four general categories: acute toxicity, chronic health effects, physical/chemical hazards, and environmental effects. Within each of these categories, 5 ratings are possible: green, yellow, red, black, or gray. The meanings of these ratings can be summarized as follows:

Green: Recommended safe product. Practically non-toxic (e.g., food or vegetable oils); no physical hazards posed; environmentally benign products.

Yellow. Generally safe product which can be recommended if used with care. Slight toxicity, don't drink or eat; slight physical hazards; slight environmental hazards

Red: Potentially dangerous product which should only be used if less dangerous alternatives are not available and if appropriate precautions for safe use and disposal are followed. Could be fatal if misused; physical hazards, safety precautions required; significant environmental hazards, special disposal procedures required.

Black: Not recommended. This product presents unacceptable health, safety or environmental risks. Extremely toxic; known carcinogen, mutagen, etc.; explosive, corrosive, or unstable; unacceptable environmental threat.

Gray: Not enough information available for rating.

Factors determining the ratings in each category are:

Acute: oral acute toxicity, inhalation potential and toxicity, skin irritation and toxicity, potential for eye irritation and damage, and potential to damage other organs. Acute hazards are evaluated on the basis of the formulated product.

Chronic: presence of ingredients which may cause cancer, gene mutations, birth defects, fetal death, sterility, neurological damage, immune system disfunction, kidney or liver damage, or other long term health effects.

Physical/Chemical: flammability and reactivity.

Environmental: toxicity to aquatic organisms and other wildlife including off-target species (pesticides), environmental persistence, breakdown products, bioaccumulation, impact on water quality, and disposal hazards.

Products rated Green should be safe for the most vulnerable of the "normal" population: small children, older adults, pregnant or nursing women, and people with heart or lung diseases.

Products rated Green should remain safe under conditions of reasonably foreseeable accidents and misuse: spills, fires, ingestion of small amounts by children, some dermal exposure, or use in non-ideally ventilated areas.

Products may not be safe for those who are chemically hypersensitive, allergic, or immune-deficient, or who have liver or kidney disorders that limit their ability to detoxify and excrete toxins.

The ratings do not include the possibility of synergistic or additive effects of household chemicals with each other or with occupational exposures, other environmental contaminants, or personal medications.

Disclaimers (also to precede any lists of products generated using these criteria):

- Product ratings are based upon data supplied by manufacturers and obtained from reference books or other sources. Products may contain ingredients or contaminants unknown to us, whose presence, if known, would change the product's rating.
- Safety of a product depends to a great extent upon how it is used. Since individuals may use a given product in different ways, the ratings determined by this system are no guarantee of a product's safety and are intended as a comparison between different products.
- These ratings are presented as an informational service. A green rating does not constitute an endorsement of a particular product. Washington Toxics Coalition makes no guarantees as to the safety or efficacy of any product rated by these criteria and assumes no responsibility or liability for any injury or damage which may occur as a result of using any such product.

Definitions (from RTECS):

ADI (Acceptable Chronic Intake) — The ADI is an amount of a substance which EPA has determined can be inhaled or ingested on a daily basis without toxic effect.

LD50 (Lethal Dose Fifty) — a calculated dose of a substance which is expected to cause the death of 50% of an experimental animal population. It is determined from the exposure to the substance by any route other than inhalation.

LC50 (Lethal Concentration Fifty) — a calculated concentration of a substance in air, exposure to which for a specified length of time is expected to cause the death of 50% of an entire defined experimental animal population.

TDLo (Toxic Dose Low) — the lowest dose of a substance introduced by any route other than inhalation to which humans or animals have been exposed over any given period of time and reported to produce any non-significant toxic effect in humans or to produce non-significant tumorigenic or reproductive effects in animals or humans.

TCLo (Toxic Concentration Low) — the lowest concentration of a substance in air to which humans or animals have been exposed for any given period of time that has produced any toxic effect in humans or has produced a tumorigenic or reproductive effect in animals or humans.

LDLo (Lethal Dose Low) — the lowest dose of a substance introduced by any route other than inhalation over any given period of time reported to have caused death in humans or animals.

LCLo (Lethal Concentration Low) — the lowest concentration of a substance in air which has been reported to have caused death in humans or animals.

TLV (Threshold Limit Value) — The TLV is an ACGIH-recommended concentration of a substance to which most workers can be exposed without adverse effect. Unless otherwise specified, the TLV value we will use is the TWA (Time-Weighted Average), defined for a normal 8-hour workday or 40-hour work week. The TLV addresses only acute toxic effects.

I. Acute Toxicity

Specific criteria follow for each major route of exposure. Toxicity of the product will be determined from the following information in descending order of priority:

- Overall product toxicity (if available from manufacturer)
- Deduction from label signal word, i.e. Danger implies LD50 < 50 mg/kg.
- Toxicity estimated from individual ingredients (if complete formula available)
- Toxicity estimated assuming most toxic ingredient =100% of formula (if only ingredient list available)

The product will receive an overall acute toxicity rating equal to that determined for the most hazardous route of exposure.

A. Oral Ingestion

Green	LD50 > 10,000 mg/kg	Practically non-toxic
Yellow	LD50 1000 to 10,000 mg/kg	Slightly toxic
Red	LD50 50mg/kg to 1000 mg/kg	Moderately to highly toxic
Black	LD50 < 50mg/kg	Highly to super toxic

B. Skin

Green	Not a skin irritant, but may cause some drying of the skin.
Yellow	Mild to moderate skin irritant (causes reddening), but not a primary skin irritant (as defined in 16 CFR 1500.41). May cause dermatitis on prolonged or repeated contact.
Red	Severe skin irritant (causes blisters or dermatitis). Primary skin irritant as defined in 16 CFR 1500.41) or skin sensitizer.
Black	Skin exposure can cause death (LD50(skin) < 500 mg/kg) or permanent skin damage, or product is corrosive (16CFR 1500.3)

C. Inhalation

For products used indoors, possible air concentrations of hazardous ingredients resulting from "normal use" and "worst case" (as defined below) are estimated. Assume product is used in a 9 x 12 room (25m^3). For outdoor products, normal use air concentration will be taken as 100 times lower than the calculated indoor concentration. Worst case situation is the same for indoor and outdoor products.

Normal use: Quantities of product needed for normal use are determined from label directions, industry guidelines, measurements, or best estimates. Product application areas will be estimated for each type of household job. Calculate evaporation rate and air concentration for volatile components. Assume a ventilation rate of 0.3 changes of room air per hour. Average air concentration over first 2 hours (unless normal mode of product usage dictates otherwise).

Worst case: Assume spill of entire container contents. Estimate expected surface area for spill, and calculate evaporation rate. Calculate maximum room air concentration of volatile ingredients assuming no ventilation.

Rating System for Inhalation

Green	Product not volatile or for each ingredient, normal use results in an air concentration less than 1% of the Threshold Limit Value (TLV). Sum of %TLVs for all ingredients must also not exceed 1%. (**Note**: if no TLV is available, use human TCLo.)
Yellow	Normal usage results in air concentration greater than 1% TLV but less than 100% TLV.
Red	Normal use results in air concentration greater than 100% TLV but less than 10 times the TLV or accident could result in air concentration exceeding 1/10 of LCLo.
Black	Normal use results in air concentration greater than 10 times TLV or accident could result in air concentration greater than the lowest lethal concentration (LCLo). (**Note**: if no LCLo available, use 1/10 of LC50)

D. Other Acute Effects

Green	May be mild eye irritant, but can cause no permanent damage. No label warning for eye irritation required.
Yellow	Moderate to severe eye irritant, but no permanent damage. Eye irritant (as defined in 16 CFR 1500.42), labelled with CAUTION or WARNING.
Red	Severe eye irritant with potential to cause permanent damage
Black	Acute exposure likely to cause permanent damage to eyes, skin, or organs, or product is corrosive.

II. Chronic Effects

If product contains unknown or undisclosed "inert ingredients", the rating for chronic effects shall be GRAY unless there are established chronic effects from the known ingredients sufficient to classify the product BLACK.

Green
1. Contains no ingredient listed as a known or suspected human or animal carcinogen or mutagen. Contains no ingredient found to exhibit teratogenic, fetotoxic, neurotoxic, or immunotoxic effects when administered by oral, inhalation, or skin routes.

and 2. A daily intake of 10 g/kg must not exceed the Acceptable Daily Intake (ADI) (as listed in the EPA IRIS database or elsewhere). If no ADI is listed, an ADI will be computed by taking 1% of the lowest TDLo or NOEL listed in RTECS. If no TDLo or NOEL is available, there can be no known chronic effects.

Yellow
1. Contains no known or suspected human or animal carcinogen or mutagen, and
2. Daily intake of 10 g/kg exceeds ADI, but dosage estimated from normal daily use does not exceed the ADI.

Red (any of the following)
1. Contains no known or suspected human carcinogen (listed by NTP, IARC, EPA, or OSHA), except as a contaminant at a level which presents a risk of 10^{-6} or less under normal use. May contain suspected animal carcinogen (1 positive bioassay or carcinogenic by RTECS criteria).
2. Normal daily use may produce a dose in excess of the ADI (but less than 10 times the ADI) unless label specified safety precautions are taken.
3. Low level exposure may cause serious chronic effects, including organ damage, persistent change in tissue structure or function, immune system disfunction.

Black (any of the following)
1. Contains known or suspected human carcinogen as an ingredient or additive.
2. Contains known or suspected human carcinogen as impurity which presents risk greater than 10^{-6} in normal use.
3. Normal usage produces a dose in excess of 10 times the ADI or (if there are no label specified safety precautions) in excess of ADI.

III. Chemical/Physical Properties

Product rating is equivalent to worst rating in any category.

A. Flammability

Green	NFPA Flammability code 0 or 1 (materials that will not burn or which must be preheated before ignition will occur), or Flash point greater than or equal to 200° F (Class III-B comb liq)
Yellow	NFPA Flammability code 2 (must be moderately heated before ignition will occur), or FP between 100° and 200° F. (Class II or III-A combustible liq)
Red	NFPA code 3 (can be ignited under almost all normal conditions) FP between 100° and 73° F. (Flammable liquids class I-C)
Black	NFPA code 4 (very flammable gases or very volatile flammable liquids.) FP less than 73° F (Flammable liquid class I-A or I-B)

B. Reactivity

Green	NFPA reactivity code 0 (normally stable and do not present any reactivity hazard.) Not a strong oxidizer or organic peroxide. No known reactions with other household products which will cause fire or poisonous compounds to be formed.
Yellow	NFPA reactivity code 1 (normally stable, but may become unstable at high temperature and pressure or in combination with other materials). Exclude anything which produces toxic gases except CO2 under those conditions. May include class V peroxide or class 1 oxidizer. No known reactions with other household products which will cause fire or poisonous compounds to be formed.
Red	NFPA reactivity code 2 (may undergo violent chemical change at elevated temperature and pressure.) Burning may produce toxic gases. May react with other household products to produce toxics. May be class 2 oxidizer or class III or IV peroxide.
Black	NFPA reactivity code 3 (capable of detonation when heated and under confinement) or 4 (so susceptible to detonation that too dangerous for firefighters to approach in fire). Product is unstable, pyrophoric, water reactive, or is an oxidizer (class 3 or 4), or organic peroxide (class I, II, or unclassified).

IV. Environmental

A product will be subject to certain of the following criteria depending on its mode of use. To determine which criteria are applicable for a particular type of product, the matrix which follows the criteria will be used. The final environmental rating will be taken as the lowest applicable rating.

A. Toxicity to Aquatic Organisms (for products likely to reach surface water)

Toxicity to the most susceptible fresh or saltwater species.

Green:	LC50 > 2000 ppm
Yellow:	LC50 between 200 and 2000 ppm
Red:	LC50 between 10 ppm and 200 ppm
Black:	LC50 < 10 ppm

B. Toxicity to other Wildlife (or off-target species)

Green:	Practically non-toxic (LD50 > 10g/kg for birds, bees)
Yellow:	Selective (e.g. toxic only to caterpillars)
Red:	Broad spectrum toxicity may endanger beneficial species.
Black:	Poses unacceptable hazards to beneficial organisms or wildlife.

C. Environmental Persistence (in river water or average soil)

Green:	Evidence for ultimate biodegradation of entire product or all ingredients to harmless substances in less than 1 month.
Yellow:	Half-life of active or toxic ingredients = 1 month to 6 months
Red:	Half-life of active or toxic ingredients = 6 months to 1 year
Black:	Half-life of active or toxic ingredients > 1 year

D. Breakdown Products

Determine most toxic breakdown product and evaluate environmental ratings of that compound. Rating in this category is equal to worst environmental rating of break down products.

E. Bioaccumulation (based on bioconcentration factor BCF)

Green:	BCF less than 10 and no evidence of bioaccumulation in food chain
Yellow:	$10 \leq BCF < 100$ and no evidence of bioaccumulation in food chain
Red:	$100 \leq BCF < 1000$ or any evidence of bioaccumulation in food chain
Black:	$BCF \geq 1000$ or clear evidence of bioaccumulation in food chain

F. Impact on Water

Green:	OK to go into sanitary sewer directly without treatment (in relatively small, consumer product amounts) and product does not meet any of the criteria for yellow, red, or black.
Yellow:	Contains ingredients of concern in some areas or wastewaters, such as phosphates, chlorine bleach, soluble nitrates, antifreeze, bacteriacides, etc.
Red:	Contains EPA-designated priority pollutant (except metals) as an ingredient, or Contains priority pollutant metals in leachable compounds or in concentrations which would account for > 10% of Metro sewage treatment loading if all residents used the product under consideration.
Black:	Contains priority pollutants of particular concern to Metro, such as PCBs, banned or restricted pesticides, mercury, lead, cadmium, chlorinated volatile solvent organics (TCE, methylene chloride, etc.), or EPA-identified leaching pesticides. For metals, the trigger concentration is the same as for the "red" category above.

G. Air pollution

Green	Contains no ingredients on the Clean Air Act Section 111 list of potential human health hazards and is not an aerosol product.
Yellow	May contain ingredients on CAA Sect 111 list, but is not an aerosol
Red	Aerosol product with ingredients on CAA Sect 111 list.
Black	Contains formaldehyde, CFCs, ingredients on CAA Sect 112 list of **hazardous** air pollutants, or other chemicals known to cause serious air pollution problems.

H. Disposal

Green:	May be disposed of down drain or in trash.
Yellow:	May be a dangerous waste, but there is an acceptable avenue of disposal through municipal sewer (ammonia).
Red:	Must be disposed of as a dangerous waste, i.e. at a household hazardous waste collection facility.
Black:	Considered an extremely hazardous waste.

Matrix Showing Applicability of Environmental Criteria

Product Type	Aquatic Tox.	Off-Gas	Persistence	Bio Products	Bioaccum	Water Sol	Oral Tox
Laundry detergent (powder)			OO	OO	OO	OO	--
Laundry detergent (liquid)			OO	OO	OO	OO	--
Laundry bleach			OO	OO	OO	OO	--
Dishwashing liquid	--		OO	OO	OO	OO	--
Dishwashing (auto powder)			OO	OO	OO	OO	--
Oven cleaner			OO	OO	OO	OO	--
Drain cleaner			OO	OO	OO	OO	--
Toilet bowl cleaner			OO	OO	OO	OO	--
Tub n tile cleanser			OO	OO	OO	OO	--
Glass cleaner							--
General purpose cleaner	--		OO	OO	OO	OO	--
Rug upholstery cleaner			OO	OO	OO	OO	--
Spot remover			OO	OO	OO	OO	--
Floor wax			OO	OO	OO	OO	--
Furniture polish			OO	OO	OO	OO	--
Disinfectant			OO	OO	OO	OO	--
Mildew cleaner			OO	OO	OO	OO	--
Air freshener							--
Paint (wall, interior)			OO	OO	OO	OO	--
Paint (exterior)			OO	OO	OO	OO	--
Paint (special purpose)			OO	OO	OO	OO	--
Paint thinner/brush cleaner			OO	OO	OO	OO	--
Stain/varnish/lacquer			OO	OO	OO	OO	--
Floor finish			OO	OO	OO	OO	--
Paint stripper			OO	OO	OO	OO	--
Wood preservative	OO		OO	OO	OO	OO	--
Marker pen/ink							--
Glue (wood, contact, construction)							--
Glue (paper)							--
Glue (plastic, epoxy, crazy)							--
Insecticide (indoor plant)	OO	OO	OO	OO	OO	OO	--
Flea spray	OO	OO	OO	OO	OO	OO	--
Flea shampoo			OO	OO	OO	OO	--
Pesticide (structural)	OO	OO	OO	OO	OO	OO	--
Insecticide (outdoor)	OO	OO	OO	OO	OO	OO	--
Herbicide	OO	OO	OO	OO	OO	OO	--
Fertilizer (outdoor)	OO	OO		OO	OO		--
Insect repellant	OO		OO	OO	OO	OO	--
Pest strips		OO					--
Insect/slug bait or trap							--
Antifreeze	OO	OO	OO	OO	OO	OO	OO

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CPSC Requirements For Hazardous Household Chemical Products

Lee Baxter

The Federal Hazardous Substances Act (FHSA) is the statute under which the Consumer Product Safety Commission (CPSC) regulates, among other things, hazardous chemicals contained in household products. The original statute was called the Federal Hazardous Substances Labeling Act and became law in 1960. This 1960 law repealed and replaced the even older Caustic Poisons Act. Regulations issued during the early years of the FHSA dealt exclusively with labeling for acute hazards.

This law has been amended many times over the years. One of the most significant amendments was the Child Protection and Toy Safety Act of 1969. This amendment provided banning provisions applying primarily to hazardous children's products. Toys, cribs, bicycles, and other children's products are regulated under this law.

In November, 1988 Congress amended the FHSA by adding the Labeling of Hazardous Art Materials Act (LHAMA). This amendment addresses directly labeling for chronic hazards.

The CPSC staff has prepared a draft proposed rule to fulfill the requirements of LHAMA, 15 U.S.C. 1277 that:

> The Commission shall issue guidelines which specify criteria for determining when any customary or reasonably foreseeable use of an art material can result in a chronic hazard.
> 15 U.S.C. Section 1277 (d) (1).

Since the scientific principles of the guidelines and criteria directed to be prepared by the LHAMA apply equally to other materials that are also regulated by the FHSA, the staff recommends that these draft guidelines address all products subject to the FHSA, not just art materials. The staff also recommends a draft proposed supplemental definition of "toxic" to specifically include chronic toxicity and to supplement the existing definitions of acute toxicity and strong sensitizers previously promulgated under Section 10 of the FHSA and appearing at 16 CFR 1500.3. The proposed supplemental definition is drawn from the proposed guidelines and criteria.

The draft **Federal Register** notice announcing the proposed rule presents the information contained in the technical papers from the Commission's Directorate of Health Sciences which are available for review in the CPSC's Office of the Secretary.

The proposed guidelines provide the scientific criteria which manufacturers would use in determining whether their products require labeling under the FHSA because the products present a chronic hazard.

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The guidelines provide information on evaluating human and animal evidence to determine whether a substance presents the chronic hazards of cancer, reproductive or developmental toxicity, or mutagenicity. Guidance is also provided on how to assess exposure to a hazardous constituent in a product, and the factors to consider in determining the risk presented by exposure to the product.

The proposed rule also presents the staff's recommendations on levels of risk or exposure which would trigger labeling under the FHSA. This policy guidance would assist manufacturers in deciding whether products containing or releasing low levels of chronically hazardous substances meet the statutory definition of "hazardous substance" under the FHSA because those substances "may cause substantial personal injury or substantial illness."

Taken together these criteria and guidelines provide a decision tree for toxicologists who are advising manufacturers regarding the labeling of products. These criteria and guidelines reflect the scientific and policy judgment that the Commission would apply in deciding whether a product is properly labeled.

A separate draft Federal Register notice codifies ASTM D-4236 (1988) as a regulation under Section 3 (b) of the FHSA. The standard would appear at 16 CFR 1500.14(b)(8).

The staff will be briefing the Commission in December on the draft Federal Register notices. A decision by the Commission will follow this briefing but a date for this decision has not been formally established.

Lifecycle Analysis - A Brief Overview

Susan Mooney
Office of Solid Waste, EPA

A lifecycle analysis (LCA) involves looking at the environmental impacts of products or materials from the beginning of the product's life (e.g., extraction of the raw materials used to make the product) through processing, manufacturing, distribution, use, reuse, recycling, and finally to ultimate disposal of the product. The term environmental impacts can include public health risks, ecotoxicity, and broader environmental impacts such as habitat destruction, global warming, and acid rain. Ultimately, we want to be able to use these analyses to systematically evaluate and compare the environmental consequences of products.

The results of this analysis can be used by industry to improve their internal decisionmaking and industrial processes. The information can also be used to educate the general public through labeling or other programs.

This analysis and the information it can produce fits in well with the overall goals of household hazardous waste management programs. An LCA can help us better identify and prioritize household hazardous products. Currently, individual programs (e.g., waste management, wastewater treatment, etc.) prioritize these products only according to problems caused within that program. An LCA would let us see all of the impacts/problems caused by the product throughout its life. In the same way, an LCA will help us identify appropriate less hazardous alternatives.

This type of analysis has been around for several decades, but has mainly been used internally by industry. In the last two years, such studies have been used to influence public debate on a number of issues (e.g., plastic vs. paper grocery sacks, disposable vs. reusable diapers). All of the studies indicated that one product or material posed less environmental impacts than another. Because these studies have been widely distributed and covered by the media, they have been carefully scrutinized. Concerns have been raised regarding assumptions made and conclusions drawn from the studies. In response to these concerns, several events have occurred and efforts have been initiated. I'll highlight three of these today.

First, in May, 1990 EPA sponsored a one-day forum that was organized by the Conservation Foundation (a non-profit organization in Washington DC). The purpose of the forum was to identify issues surrounding LCAs. No attempt was made to resolve these issues or reach consensus. Many issues were raised during

the one day event ranging from whether risk assessments should be included in the LCA to how data should be presented. A summary of this forum is available from the Conservation Foundation.

Second, in August, 1990 the Society of Environmental Toxicology and Chemistry (SETAC) organized a five day workshop, the purpose of which was to develop a technical framework for conducting LCAs. One of the most important outcomes of the workshop was a new way of looking at and discussing LCAs. Participants of the workshop agreed that an LCA was not just one large study, but rather a study with three distinct components. The first component was the inventory. The inventory includes the identification and listing of all inputs (i.e., raw materials and energy) and all outputs (i.e., solid wastes, air emissions, and wastewater). The inventory does not include an analysis of the toxicity of the wastes or of the environmental impacts of the inputs or outputs.

The framework for conducting the inventory is fairly well established and the workshop participants spent most of the workshop working on outstanding issues surrounding this component. In fact, the inventory is actually what is being done today. None of the recent studies (e.g., paper vs. plastic bags) have evaluated waste toxicity or other environmental impacts. Therefore, these studies should avoid conclusions regarding environmental impacts and instead make conclusions regarding the amounts of energy, raw materials, and wastes produced.

The second component of an LCA is the assessment of environmental impacts. This component would include an evaluation of the toxicity of (and risk posed by) wastes produced and the general environmental consequences of all inputs and outputs. A method for conducting such an assessment is not well established.

The third component of the LCA is an assessment of ways to improve the "system". This is an analysis of methods to reduce impacts and to make changes to the industrial process so that fewer wastes are produced and fewer resources are used. Industry has been conducting a form of this type of assessment for many years.

The proceedings from this workshop should be available from SETAC by early 1991.

The final effort I'd like to highlight today is an EPA study. We plan to develop a methodology for conducting LCAs. Using the terminology from the SETAC workshop (described above), EPA first plans to develop a guidance document for conducting an inventory so that the method is publicly available and then will develop the method (to the extent possible) for assessing environmental impacts. This will be a two year effort involving many of the offices at EPA.

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OTS' PRODUCT STEWARDSHIP

AND INTERNATIONAL PROGRAMS

by Larry Longanecker

Good Morning, ladies and gentleman. I want to cover two topic areas in today's presentation. Both are programs that the Environmental Protection Agency's Office of Toxic Substances is working on: the first we have termed Product Stewardship and is a rulemaking effort. The second is a program of chemical assessment in conjunction within the Organization for Economic Cooperation and Development (OECD).

First, Product Stewardship. OTS is evaluating a number of rulemaking approaches that would foster improved communication of information on toxic chemicals and enhanced awareness, both on the part of chemical manufacturers and processors/users, of hazards and of opportunities for reducing release of and exposure to chemicals.

One rulemaking (FIGURE 1) would require that companies assess the environmental hazards of each chemical they manufacture. For any chemical meeting hazard criteria established by EPA, the company would be required to communicate the following information to customers:

1) environmental hazards of the chemical, including aquatic toxicity; persistence and bioaccumulation, ozone depletion potential; and other effects.

2) recommendations for safe handling and disposal of wastes;

3) citation of Federal environmental standards, for example, drinking water limits.

This rule would be modelled along the lines of the Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard. Under that rule, Material Safety Data Sheets (MSDS) are prepared by chemical manufacturers. Formulators must then prepare an MSDS that characterizes any hazardous mixtures they prepare. Information flows to customers and workers are trained in the proper handling of the chemical.

EPA is working with OSHA to determine whether these environmental data would be required on the MSDS or whether separate environmental data sheets would be acceptable or preferred.

I should note that several international organizations have recommended that environmental hazard information be included on MSDS's. Also, the Chemical Manufacturers Association guidelines for MSDS include recommendations for environmental data.

ENVIRONMENTAL HAZARD COMMUNICATION

HAZARDS

- Aquatic Toxicity
- Avian Toxicity
- Mammalian Toxicity
- Ozone Depletion
- Other Effects

WASTE HANDLING / DISPOSAL

FEDERAL ENVIRONMENTAL STANDARDS

PRODUCT STEWARDSHIP

MANUFACTURERS OF CHEMICALS

- Section 313
- Addition of Chemicals by Rule

LIFECYCLE ASSESSMENT of the CHEMICAL

- Hazards
- Exposure/Release Potential
- Risks
- Potential Controls, Substitution, Use Reduction
- All Aspects Beyond the Manufacturer's Fenceline

PRODUCT STEWARDSHIP PLAN

- Conclusions of the Lifecycle Assessment
- Manufacturers' plans viz
  - Improved Transfer of Information
  - Direct Technical Assistance
  - Change in Packaging, Delivery, Purity
  - Publicly Available

OECD HIGH PRODUCTION VOLUME SCREENING DATA SET

CHEMICAL IDENTITY

CHEMICAL / PHYSICAL PROPERTIES

ENVIRONMENTAL FATE

ENVIRONMENTAL EFFECTS

HEALTH EFFECTS

OECD RISK REDUCTION CHEMICALS

LEAD CHEMICALS	LEAD ORGANIZATION
MERCURY	NORDIC COUNTRIES
METHYLENE CHLORIDE	SWEDEN
CADMIUM	COMMISSION OF EUROPEAN COMMUNITIES
BORMATED FLAME RETARDENTS	THE NETHERLANDS

To summarize environmental hazard communication, it would: apply to all chemicals covered by the Toxic Substances Control Act; require a hazard assessment; and, based on the hazard, provide information to downstream industrial and commercial customers. It would not require that companies test the chemical but that they report available data, including that in references or databases specified by EPA.

The second part of Product Stewardship is more complex (FIGURE 2). The basic idea behind Product Stewardship is that a chemical manufacturer should evaluate the processing and use of its products and incorporate its findings on hazards, release, and exposure into its decision-making.

Product Stewardship, as envisioned now, would be a lifecycle assessment and planning requirement, not a prescription for example, that the manufacturer not sell a chemical for a particular use. Chemical bans or phase-outs under the Toxic Substances Control Act (TSCA) would be rulemakings quite distinct from Product Stewardship.

The Agency is investigating a number of approaches to implementing some type of stewardship requirements. Let me first say that any rule would apply to selected chemicals, not the entire universe. One idea is to first apply it to Section 313 chemicals, presumably with some phase in to cover over 300 chemicals. Additional chemicals would be covered by notice and comment rulemaking.

One feature of Product Stewardship is lifecycle assessment. This would be a review of available data on the hazards of the chemical (health as well as environmental) and its processing and use by downstream customers. The evaluation would extend to consumer use of the chemical, not be limited to industrial/commercial application.

The chemical manufacturer would be expected to evaluate the potential for waste generation, environmental release, and human and environmental exposure. The assessment would focus on the chemical although other factors such as energy use could be included. "Reasonably available" data would be used in the assessment: there would not be a requirement that, for example, monitoring be conducted in order to characterize release.

EPA would expect the lifecycle assessment to reach conclusions about the risks attending the processing, use, and disposal of the chemical. Based on this assessment, the chemical manufacturer would be required to prepare a plan for addressing any hazards/risks identified in the lifecycle assessment. The plan would consist of the actions the manufacturer has taken or will take regarding the chemical. EPA would expect companies to consider and include in the plan elements such as:

1) enhanced communication;
2) direct technical assistance;
3) changes in the packaging, transportation, or purity of the chemical that could assist the customers;
4) agreements to sell only under controlled situations;
5) decisions not to sell for particular uses and perhaps to develop safer substitutes for some uses.

EPA is considering other approaches than the basic one I have just laid out. Rules could focus on lifecycle assessment for a limited set of chemicals, with submission of data to EPA. A rule might also emphasize particular information, such as data on recycle, beyond what would be required under hazard communication.

OTS will be developing these ideas over the next year. We intend to work cooperatively with industrial group(s) to test ideas on product stewardship.

We also intend to pilot the lifecycle assessment approach for one or two chemicals and to begin to use product stewardship ideas and requirements in reviewing new chemicals under TSCA.

Now to the second part of my talk. For many years OTS has worked within the Organization for Economic Cooperation and Development (OECD) on chemical assessment methodologies and information collection. Past initiatives have led to agreements on testing guidelines, good laboratory practices, and the mutual acceptance of data.

Two current activities may be of particular interest to you. New initiatives are directed at the development of a broad program of international cooperation in the testing, assessment and control of the large number of existing chemicals in commerce.

The OECD is a unique grouping of countries, including Europe, Scandinavia, Japan, the US, and Canada, representing most of the world production of chemicals.

In November 1989 OECD member countries agreed to jointly investigate the potential health and environmental effects of international high production volume chemicals. This effort had its source in the fact that a relatively small fraction of the chemicals in international commerce accounted for over 90% of the total production volume of all industrial substances. Based on this, OECD agreed that the fact of high production volume provided sufficient evidence of potential exposure such that a minimum set of test data should be available on the highest volume chemicals. Accordingly OECD initiated an effort to identify the set of international high production volume chemicals and subsequently to characterize the extent of the available data on these high volume chemicals. HPV chemicals were defined for purposes of the OECD effort as those chemicals

produced in excess of 1,000 metric tons per year in 2 or more OECD Member countries or in excess of 10,000 tons per year in 1 OECD country. The initial international HPV list contained approximately 1,300 chemicals. The list of HPV chemicals was then evaluated by the OECD countries and the chemicals divided into those for which significant data were available, chemicals of no current concern, and substances for which concerns had been identified but where available data were limited or nonexistent. This last subset of high production chemicals was identified for priority attention under the HPV effort. This set of 147 chemicals is now the focus of a voluntary OECD program to develop screening level test data. The set of screening data developed and agreed to by OECD member countries is known as the Screening Information Data Set or SIDS test set. The SIDS set was developed through the efforts of a series of OECD expert meetings and consists of the data elements in the following categories:

(FIGURE 3)

- chemical identity
- physical chemical properties
- sources of exposure
- environmental fate
- environmental effects
- health effects

The OECD has now initiated the pilot phase of the SIDS/HPV program in which 14 OECD member countries voluntarily agreed to handle a total of 53 chemicals. The US has responsibility for 9 of the 53. Since June of this year OECD countries have been gathering the available data on these 53 chemicals. The dossiers prepared by each country were shared with all other OECD countries in October for their review. This week in Paris the dossiers are being reviewed in an OECD expert meeting and conclusions are to be developed concerning needed SIDS testing. If all goes as planned, the testing is scheduled to commence in December or January and SIDS testing on the pilot chemicals is due to be completed by the summer of 1992. At that point the full set of information will be assessed by the OECD and conclusions reached as to needed additional testing to confirm the results of SIDS testing.

In contrast with the SIDS effort wherein the fact of high production sufficed to demonstrate adequate exposure potential, confirmatory testing judgements will be made based on a fuller understanding of the relative exposure and the level of toxicity observed in the SIDS tests. An important aspect of this stage of the program is that in assessing the results of the tests the OECD will need to work to develop a framework for "mutual acceptance of evaluations" - the idea that evaluations performed in one OECD Member country will be consistent with those performed in other OECD countries. The achievement of MAE will allow for even greater cooperation and possible harmonization in the future. Meanwhile, in early 1991, the OECD will initiate efforts on the next set of 94 SIDS/HPV chemicals with several

hundred additional chemicals to be handled in subsequent years. If all goes as planned, the OECD's SIDS program is slated to handle over 400 HPV chemicals.

Within the US, the SIDS/HPV effort has been supported and developed through the combined efforts of government, industry, and environmental groups and unions. Using a dialogue process implemented through the Conservation Foundation, US positions on the SIDS program have been developed which have the strong support of all constituent groups, thus allowing the US to take a strong leadership role in the international community in support of the SIDS program. Participation by US industry is voluntary and, thus far, industry has evidenced strong support for the program.

The SIDS/HPV program has recently been complemented by an effort to initiate a cooperative risk reduction program under the aegis of the OECD overall existing chemicals program. This effort had its start in November 1989 when Sweden proposed that OECD initiate a "sunset chemicals" program to reduce or phase out the use of certain chemicals presenting high risk concerns. While conceptually of interest to the US, a program based on sunsetting was viewed as being too narrowly drawn and that to be successful the program should be broadened significantly to include the concepts of:

- pollution prevention;
- development of emissions inventories, similar to those developed in the US under section 313 of the Superfund Amendments and Reauthorization Act (SARA); and
- development and commercialization of safer substitutes for problematic chemicals or uses. Using a US dialogue process, the US developed the thinking behind its concept of a more broadly drawn program of based on risk reduction. The OECD strongly supported the US proposal and recommended its implementation as a component of the OECD's overall existing chemicals program. In May 1990, OECD Member countries decided to implement an OECD risk reduction program, with an initial focus on 5 chemicals using a lead country approach. The chemicals and country leads are shown in the slide: (FIGURE 4) Pb - US; Hg - Nordic countries; Cd - Commission of the European Communities; methylene chloride - Sweden; and brominated flame retardants - the Netherlands. Efforts at this time are focused on developing an understanding of ongoing risk reduction efforts in member countries and development of possible cooperative risk reduction efforts. As part of the effort on methylene chloride, the US is holding an international meeting on February 1991 on the topic of substitutes for methylene chloride in paint stripping uses. The OECD risk reduction program will provide an excellent opportunity for the OECD to explore diverse regulatory and nonregulatory approaches to risk reduction in an international arena.

JIM KNUTZON
Green Cross Certification

Presentation to the
Household Hazardous Waste Management Conference

Green Cross is a not-for-profit division of Scientific Certification Systems, Inc. (SCS) an independent certification company based in Oakland. SCS was founded in 1984 to provide neutral third-party assessment of product claims in the market and to develop scientific procedures for the certification of significant claims.

The Green Cross Division was established specifically to conduct independent evaluations of products meeting exceptionally high environmental standards. Our goal is to support manufacturers in their efforts to achieve the highest standards of performance with respect to the environment and help manufacturers differentiate their products in the marketplace. There are manufacturers out there that are doing very important work -- and doing a very good job. And there are obviously others who do not share the same intense interest in seeing an improvement in the environment.

Through our efforts, we hope to help retailers distinguish significant environmental claims from those that are insignificant, unsubstantiated or potentially misleading to consumers, and to provide consumers with the added assurance of independent third-party certification in evaluating products' environmental claims.

Green Cross operates as a neutral third-party with a strict scientific perspective toward the evaluation of claims. Before making evaluations, we publish scientific standards for peer review. We have taken these standards to government agencies such as the Environmental Protection Agency, the Federal Trade Commission, and the Attorneys Generals of several states, and have presented them in conferences, seminars, and meetings around the country. Another group which has reviewed our work is the Good Housekeeping Institute, which also has assigned its Director of Chemistry, Dr. Paul Demko, to serve on an independent scientific advisory board to Green Cross.

We have developed a scientific staff to specifically carry out product claim assessments against those standards. Strict scientific auditing and verification procedures govern the certification process.

Green Cross certification claims are accessible to all interested retailers and manufacturers on a non-exclusive basis. We want to encourage anybody and everybody's participation who has a valid claim to make in the marketplace, or who wishes to assist the process in making these claims known to consumers.

All certification and consulting services are provided on a fee-for-service basis, to cover the costs of our certification work. But having your product reviewed by Green Cross is no guarantee that your claim will be certified. If you earn the Green Cross certification, you are free to use our emblem without paying any licensing fees.

All evaluation work is conducted under the strictest confidentiality, backed by legal contracts. This is a very important aspect. One of the common themes I listened to in the previous speeches was how you can convince a manufacturer to allow access. Access is the only way you can make an accurate assessment. You have to be inside in order to make a thorough examination of the process. We have convinced a great many manufacturers that our total responsibility is to their strict confidentiality. Many processes and products are not patented. Secrecy in trade is very important to a lot of people. And we have successfully negotiated, sometimes over months, to gain what access we need to perform our work. If we can't get the access, we don't perform the work.

Green Cross certification standards are applicable across product categories, making it possible to present a unified system of claims to the consumer. We're material neutral. We want to see anybody that's doing good work get represented accurately.

Our first and most extensive program at the present time is our recycled content. We started there because this is an area in which industry has made important strides which deserve recognition and which are having a significant impact on environmental problems such as solid waste. We also believe that consumers are particularly interested in industry recycling efforts as they become more involved in their own recycling efforts and want to see what happens to the end results of their efforts. It helps consumers when they can see that their efforts end up in some usable product.

I'll briefly go through our recycled content standards. First, the product or package must meet the adequate performance specifications. In other words, the product or package must perform the function. A manufacturer simply can't expect to keep consumer support for an inferior product or package that does not perform the function. Second, the minimum amount of virgin material required to manufacture a 100% virgin product meeting the above performance specifications will serve as a reference amount for evaluating recycled products. Essentially what that's saying is that we don't want to take a totally virgin package or product and add recycled content to it just to make sure somebody satisfies a requirement.

Third, the recycled content in the product must come from consumer or industrial waste sources to be counted, but not from industrial scrap. The idea is to divert waste from the waste stream, whereever it is generated. In determining what is consumer waste, industrial waste, and industrial scrap, we've had discussions with government officials, industry groups, environmental groups,

and a variety of other sources. We define consumer waste as any product or packaging material which has been discarded by an individual, commercial enterprise or public/private entity after it has fulfilled its intended application of use. Industrial waste is a material which has been generated as a by-product of a given process which has properties significantly different than those of the original material, and therefore, in its current form, cannot be recycled back to the same general process. That definition is trying to keep people from making claims on what has historically been recycled as an industrial scrap product. The percentage of recycled consumer waste must meet a 10% minimum requirement for post-consumer.

Fourth, the percentage of recycled material used in the product or packaging, adjusted for any increase in weight, must be equal to or exceed 80% of the level verified as "state-of-the-art." What we're trying to say is ... we're trying to identify those who are doing the best job. Those companies who have invested in the processes and technologies to achieve state-of-the-art recycled content levels deserve that recognition.

The review process is ongoing. Recycled content is reviewed on a quarterly basis. It is not a static system. There are constant changes. If someone falls out of the state-of-the-art window, they have a year to get back up to the next audit period to qualify to again retain our certification.

The procedures for evaluating the recycled content are the following. We operate from a disclosure statement from manufacturers. We have legally-binding agreements. This guarantees our access to critical information. We review all the supporting documentation and we also do the appropriate on-site inspections. We go to the physical plants. We audit the books. We examine the processes. We record the activities and monitor the paper-trail. This is a continuing process. Once we've been to a manufacturer, and understand the processes, we adjust our record keeping accordingly.

I'd like to leave you with a few thoughts on the subject of life cycle analysis. Life cycle analysis is going to become the most hotly debated issue of the environmental marketing arena. Ostensibly, it refers to a cradle to grave analysis of a product, where every aspect of the product's manufacture, distribution, use and disposal is evaluated. But in fact, this term has been widely used of late in a looser fashion — to refer to less comprehensive analysis where only certain key factors are considered.

As a research tool, that's OK. As a marketing tool, any analysis that is less than comprehensive should not be tolerated. The reason is that this can lead to situations where crucial factors are actually left out of consideration altogether. For example, in a comparison of two life cycle reviews of disposable vs. cloth diapers, one company left the category of "resource depletion" entirely out of its consideration.

Any suggestion to the consumer that a life cycle analysis has been performed should not leave such glaring holes. At Green Cross, we believe that

the only appropriate application of life cycle analysis as a certified marketing claim can be when a product is proven to be the clear-cut best environmental performer in all categories of performance. These categories are resource use, energy use, solid waste generation and disposal, and toxic waste generation and disposal. The evaluation must include the product inputs, as well as the product and packaging, and must cover all aspects of raw material extraction, product manufacture, distribution, use and disposal.

The reason life cycle certification should be reserved for such strict circumstances is that, in fact, there are very few products which should be earning a broad environmental endorsement. Such endorsements, when applied loosely, can only have the unfortunate effect of convincing consumers that problems have been solved, when in fact they haven't. Far better, we believe, to certify specific, nameable achievements, than to issue loosely defined seals of approval.

The EPA has established a task force on the subject of life cycle analysis. Before Green Cross would publicly issue a life-cycle certification, we plan to submit the product and its documentation to the EPA for proper peer review. We would hope that any other organizations purporting to do life cycle analysis would at least do the same.

GREEN SEALS

HARNESSING MARKET FORCES TO PROTECT THE EARTH

Denis Hayes

INTRODUCTION

According to a 1989 New York Times/CBS News poll, an astonishing 80 percent of all Americans believe that "protecting the environment is so important that requirements and standards *cannot be too high*, and continuing environmental improvements must be made *regardless of cost* (emphasis added)." Even allowing for the error margins inherent in opinion sampling, this is an extraordinary expression of support for the primacy of environmental values over narrower economic interests.

Adding significance to the 1989 poll results is that they fall in line with a decade-long trend. When the *New York Times* first asked this question in a 1981 poll, just 45 percent agreed. Agreement with the proposition has increased regularly with each subsequent polling -- even in the environmental dog days of James Watt and Anne Gorsuch.

People are manifesting their concern for the environment in myriad ways. Increasingly, environmental issues influence politics, law, education, religion, investments, and lifestyles. One of the most intriguing demonstrations of rising environmental consciousness is in consumer behavior.

A 1989 market survey performed for the Michael Peters Group -- a leading international consulting firm specializing in new product design -- found that 89 percent of Americans express concern over the impact that their purchases make on the environment, and more than half claim to have refused to buy an item because of the environmental harm it caused.

A consumer boycott of aerosol propellants in the late 1970s led to a federal ban on the use of ozone-depleting chlorofluorocarbons (CFCs) as propellants. A consumer boycott of the nation's tuna canning companies in 1989-90 arguably did more to protect dolphins than had the previous two decades of environmental lobbying in Washington, D.C.

Moreover, boycotts are now being joined by positive

"buycotts," as increasing numbers of consumers patronize manufacturers that are viewed as friendly toward the environment. Environmentally-sensitive consumers have propelled such young companies as the Body Shop, Esprit, Aveda, Ben and Jerry's, and Tom's of Maine into some of the most successful enterprises of the 1980s.

According to a national survey conducted last year for *Advertising Age* by the Gallup Organization, 96% of women and 92% of men would make a special effort to buy products from companies trying to protect the environment; 90% of women and 87% of men indicated that they would be willing to pay more for products or packaging that are environmentally safer.

But consumer-driven concern for the environment could be undermined if people were to change their habits or pay a premium to buy what they though was an environmentally superior product -- only to later learn that they had been misled. Indeed, an alarming level of skepticism has already developed, doubtless rooted in empty claims that products are degradable, biodegradable, photodegradable, natural, recycled, recyclable, environment friendly, earth friendly, ozone friendly, etc.

Seven out of ten American adults now dismiss the environmental claims of most manufacturers as hype. They want some independent body that they can trust to give them the truth about which soaps, paints, light bulbs, refrigerators, and other consumer products are doing an exceptional job of protecting and enhancing the environment.

A 1990 poll conducted by Research and Forecasts found that 80 percent of the public would be inclined to rely upon an environmental label affixed to a product if the label were awarded by an independent group whose competence and integrity were beyond question. That is the mission of the Green Seal, a new non-profit group formed by environmentalists, consumer activists, and other leaders.

DRAWING ON THE EXPERIENCE OF OTHERS

A prerequisite to creating a successful environmental certification program for the United States is to profit from what has been tried elsewhere:

Germany. The Federal Republic of Germany established the first environmental labeling program in 1977. It is managed by the private German Institute for Quality Assurance and Labeling, with the Federal Environmental Agency acting in an advisory, but a very influential, capacity. Criteria are set by experts drawn from industry, consumer groups, environmental groups, and elsewhere.

The program's seal, called the "Blue Angel"--the United Nations logo of a blue figurine inside a circle of grain--has now been awarded to over 3300 products in 58 product categories. About 200 suggestions for new product categories are received by the program each year. A 1987 survey found that 70 percent of German households were familiar with the Blue Angel. Moreover the criteria for the Blue Angel are usually adopted by all levels of government in specifications for governmental procurement.

Although the German program aspires to encompass the myriad impacts caused by a product through its entire life cycle, in practice the German criteria are sometimes limited to a single factor. For example, certain gasoline-powered lawn mowers are eligible for the seal based solely on their noise levels--without reference to the fact that hand-pushed lawn mowers make even less noise and also consume no fossil fuels.

This single criterion approach has been criticized as overly simplistic. The German program has also been criticized for allowing its product criteria to become outdated. Nevertheless, it is having a positive impact on the environment. For example, according to one recent study the program has had a significant impact on paper manufacturers' investments in new plants, changes in production practices, and development of improved products. The Blue Angel's managers estimate that their seal has resulted in a 30 percent reduction in average emissions from oil and gas heaters, and a cumulative reduction of 40,000 tons of organic solvents from household paints reaching the waste stream. Today, Blue Angel-approved paints have a 30 percent market share, compared with just 5 percent before the program began.

Canada. The three-year-old "Environmental Choice,"labeling program is more dominated by the government than is the German program.Its staff members are employees of Environment Canada (the federal environmental agency),and the Minister of the Environment is responsible for the program under law; he or she must approve all the Environmental Choice guidelines before their final issuance. And although the program is governed by a volunteer board that is technically "independent," the board and its chairman are selected by the Environment Minister. The Canadian program's "EcoLogo" symbol is a maple leaf composed of three doves -- symbolizing consumers, business and government all working in unison.

Guidelines for ten Canadian product categories have now been established,and draft guidelines have been prepared for six more. Environmental Choice attempts to use a multiple criteria, cradle-to-grave approach. Initially the Canadians planned to use a matrix that awarded points to each candidate product based on its environmental acceptability at each stage of its life

cycle. That approach proved too rigid, however, because it can require enormous amounts of analysis at stages where environmental impacts are minimal, and it has been abandoned in favor of a more flexible *ad hoc* method.that focuses attention where impacts seem to be greatest.

Although Canada's program has not been in place long enough to allow an informed judgment of its impact, a recent independent report notes that the response to date from most consumers and most industrial participants has been positive. Nevertheless, some environmental critics argue that the criteria are too slack and that important (but non-obvious) impacts may be overlooked. Others argue that products possessing only trivial environmental advantages are being awarded the seal. Other critics have claimed to see evidence of political influence.

Japan. In February, 1988, Japan's Environment Association, under the direction of the country's Environment Agency, began a labeling program known as "Eco-Mark." The program uses a label that contains the letter "e", shaped into arms and hands, cradling the earth.

From seven categories in February, 1988, the program has now expanded to cover 22 categories. At this writing, an amazing 441 individual products have been licensed to use the Eco-mark.

But some critics voice concern over the superficiality of analysis allowed by Japan's rush to process as many labels as possible as swiftly as possible. There is also criticism of the Eco-Mark's early emphasis upon product categories with trivial environmental consequences (such as sink filters, kitchen strainers, sponges, and "cans with stay-on tabs.") Supporters argue that Japanese consumers have not yet experienced the surge of environmental awareness that gripped other industrial countries in the 1980s, and that the Eco-Mark is intended to encourage only a very modest first step toward heightened environmental awareness.

Other Programs Outside the U.S. Several other countries are planning or discussing environmental labeling programs. Norway is developing a labeling effort using a new, independent non-profit foundation. A government commission in Sweden has proposed a green labeling effort. Meanwhile, all the Scandinavian countries have considered using a common symbol and a common set of labeling criteria.

Independent programs are currently under development in France, the Netherlands, Great Britain, and Spain. In addition, the European Commission is investigating a possible labeling program for the European Economic Community, to begin in 1992 with the greater European integration.

INITIATIVES IN THE UNITED STATES

Compared to other countries, there has been little activity in the U.S. federal government to implement an environmental labeling program, although the idea has been studied. In 1989, the U.S. Environmental Protection Agency commissioned a report from a consulting firm--Applied Decision Analysis--on the possibility of such a program. The ADA report recommends creation of an independent, non-profit organization very similar to the foundation that runs the Norwegian program, rather than placing such an effort inside a federal agency.

Various EPA offices, including the air and solid waste programs, have commissioned studies that may be relevant to a possible U.S. labeling program, including research into life cycle product analysis and package labeling to reduce waste.

Some members of Congress have proposed legislation to establish federal labeling of packaging and products. But passage seems unlikely. Representatives of several large national environmental organizations have opposed the legislation, arguing strongly that a private effort would be preferable to a governmental program because (A) government moves so slowly that it could probably not issue its first seal for 5-10 years; (B) political pressures would be inevitable as soon as a seal caused market share to shift, with negative economic impacts in some congressional districts; and (C) consumers tend to trust private "seals" (for example, Underwriters Laboratories, Good Housekeeping, and the Kosher seal) more than they trust government to make such decisions. Passage is also unlikely because both Congress and the President are reluctant to undertake any new programs during this time of soaring budget deficits.

Meanwhile, there has been some action at the state level and in the private sector. Most state activity to date has focussed on reducing waste by labeling product packaging. New York has a law regulating the labeling of products as "recycled," "recyclable" or "reusable." Rhode Island recently proposed labeling rules for recycled products. The state of Washington has passed legislation creating a task force to develop a labeling program for packaging. Illinois and Minnesota have debated similar legislative proposals.

Several retail chains including Wal-Mart Stores, Safeway, Giant and Loblaw either have adopted their own environmental labeling programs or have set aside aisles to call attention to products whose manufacturers make environmental claims for them. Most of these chains do no independent verification of manufacturers claims, however. Four western supermarket chains, including Ralphs Grocery and Payless, have announced an intention to work cooperatively to encourage environmentally

sensitive consumption. Scientific Certification Systems, a small California laboratory that certifies pesticide-free products, has announced plans to eventually issue a "green cross" seal to certain non-food products that it judges to be environmentally attractive.

Already, some of these state and private-sector initiatives have been criticized in the news media as contributing to a proliferation of separate and potentially confusing labels. Moreover, retailers' claims are under the same cloud of suspicion by consumers as are manufacturers' claims, since both have a vested interest in increasing sales. One national environmental group is considering a major campaign against misleading environmental claims--"greenwash"-- by retail chains.

THE AMERICAN "GREEN SEAL"

The need has therefore emerged for an authoritative non-profit national environmental certification program to cut through the cacophony and provide consumers with a source of trustworthy information about environmentally acceptable products. Having sought to learn from the successes and mistakes of others--not only in studying environmental labeling programs around the world but in consulting with key certification experts in the United States, including Underwriters Laboratory, Consumers Union, and the Good Housekeeping Institute--Green Seal now is embarking upon an ambitious effort to establish a de facto national standard. In general terms, the decision-making process for the U.S. Green Seal will proceed as follows:.

In general terms, the decision-making process for the U.S. Green Seal will proceed as follows:

1. **SELECTION OF PRODUCT CATEGORIES.**

   On a regular basis, Green Seal will issue a public call for nominations for categories of consumer products to be considered for the seal. Manufacturers, trade associations, environmental and consumer groups, and government officials will be contacted directly and asked for their assistance. From this public input, the Green Seal board of directors will decide which categories should be assigned the highest priority for evaluation.

   In weighing which categories to select, the board will consider recent innovations in product design or manufacturing processes that may constitute an environmental "breakthroughs." Other important factors include the overall significance for the environment of each proposed category, and the likelihood that consumer

decisions about each category will be strongly influenced by environmental considerations.

2. **DEVELOPMENT OF PROPOSED PRODUCT CRITERIA.**

Green Seal's staff will approach public interest organizations,scientists, trade associations, and government officials to solicit recommendations about the appropriate environmental criteria for each category chosen for inclusion in the Green Seal program. Similarly, it will contact manufacturers of products in each category. The criteria may cover any and all stages in the product's life cycle, from the mining of its raw materials to its eventual recycling or disposal.

Final decisions on criteria will be made by Green Seal's "Environmental Standards Council", composed of independent scientists and other experts qualified to evaluate environmentally-based standards for consumer products.The Council, like the Green Seal board of directors and the staff, will operate under a strict Code of Ethics assuring that no person can influence a labeling decision in which he or she has a financial interest.

3. **PUBLIC REVIEW OF PROPOSED PRODUCT CRITERIA.**

Once proposed criteria have been established, they will be published -- along with their rationales -- for review by the public. Green Seal will make a special effort to reach out to the affected industry, to labor, to governmental regulators, and to environmental and consumer interests. Green Seal will accept written comments on the proposed criteria. In the case of especially important or controversial criteria, it may hold public hearings on them.

4. **FINAL APPROVAL**

Following the public review period, Green Seal's staff will analyze the public comments received and propose any appropriate changes in the criteria. The Environmental Standards Council will then make the final decision. The criteria thus established will be sent to manufacturers of products in the category, to those who commented on the proposed product criteria, and to other interested persons.

5. Product Testing and Certification

Once criteria have been established, any company that believes it sells a product meeting those criteria may apply to Green Seal for a license to use the seal on packaging and in advertisements. A fee will be established at a level to cover all expected expenses of research and testing of the product. Small manufacturers for whom the fee would be a hardship will be given special consideration.

Green Seal will determine whether a product meets the Green Seal criteria, as reflected in the results from independent testing laboratories as well as research into the product's manufacturing and disposal. Such research will be conducted by Green Seal staff, with the help of contractors with specialized expertise; and it will draw upon verified data presented by the company or by government agencies.

6. GRANTING THE GREEN SEAL.

All products that meet or exceed the Green Seal criteria will be eligible to use the mark. Licenses will be issued to such products for an initial period of no more than three years. The license agreements will provide, among other things, that the company must continue to meet or exceed the established product criteria.

Green Seal will monitor each licensee's compliance with the Green Seal criteria. This monitoring may include random testing of products, site visit to manufacturing facilities, examination of government regulatory records, and such other actions as may be needed to assure that the integrity of the Green Seal is preserved.

7. RECONSIDERATION OF PRODUCT CRITERIA.

The environmental criteria established for each product category will be reviewed at least once every three years. Where appropriate, new criteria will be proposed and a new public comment period held. The purpose of this periodic review is to aggressively encourage and reward innovation, as well as to incorporate any new information on environmental impacts.

The process described above should be viewed as a first step in an evolving effort to design a flexible but highly effective environmental labeling program. It attempts to accommodate the

need for rigorous standards with a need to respond swiftly to important technological innovations. The process may be altered as Green Seal acquires more experience and as useful suggestions are received.

Limits To Influence

"Green" consumer organizing may be the most powerful new environmental force to emerge in the last decade. However, it has important limits. It is a supplement to other forms of environmental activism, not a substitute for them.

Green consumption is still consumption. When the goal is to stop consumer use of a whole class of unnecessary products -- such as electric can openers -- or to reduce the amount of consumption of goods in whole categories -- such as fossil fuels -- a Green Seal will be of little help.

Moreover, there are myriad problems for which consumer action is not an effective instrument. Consumer power will have little effect upon toxic dumps at military bases. Consumers cannot stop a freeway or build a public transportation system. Consumers will not safeguard national parks or promote sustainable agriculture in the Horn of Africa. All these, and thousands of other, environmental objectives can be achieved only through traditional environmental activism.

Still, the remaining roles for consumerism in shaping the environment is formidable. Given that no company can afford to lose market share, people have enormous power to promote rapid change by business when they send clear signals through the market. If the Green Seal gives environmentally superior brands a meaningful advantage in the marketplace, competitors must respond immediately--doing whatever is necessary in order to win a Green Seal for their own products.

Denis Hayes, an attorney and former adjunct professor of engineering at Stanford University, chairs the board of directors of Green Seal. He was also the International chair of Earth Day 1990.

the minnesota project

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MEMORANDUM

January 23, 1991

To: People Interested in the Results of the Networking Breakfast for Rural Communities Dealing with Household Hazardous Waste Held at the Household Hazardous Waste Conference in San Francisco in November, 1990

From: Lola Schoenrich and John Lamb, Minnesota Project

RE: Summary Notes of the Meeting

The Minnesota Project hosted a Networking Breakfast meeting entitled "Networking Meeting for Rural Communities Dealing with Household Hazardous Wastes" in conjunction with the EPA Household Hazardous Waste Conference in San Francisco November 5-7, 1990.

While you did not attend the meeting, you at some point indicated an interest in seeing the results of the meeting. To that end, we have included the summary notes of the meeting, the list of people who attended the meeting, and the list of other interested parties. Unfortunately, it took us some time to dig out of the pile of work we encountered when we got back from the conference. We trust that you will still find these notes interesting and helpful.

As next steps, the group decided to do two things. First, people attending the networking breakfast were interested in sharing information about their programs. We invite you to participate in this exchange by sending a brief summary of your program to everyone on the list along with a request for information on their program. Participants in this exchange should end up with a rich resource file on household hazardous waste programs in rural communities. We have included a brief summary of the programs in which the Minnesota Project is involved.

The second next step will be to host a second Networking event for Rural Communities in conjunction with the 1991 Household Hazardous Waste Conference. We invite you to keep posted and look forward to this event later in 1991.

Please feel free to call either Lola Schoenrich or John Lamb at (612) 378-2142 with questions about our programs or the Rural Networking Breakfast.

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Household Hazardous Waste Conference

San Francisco, California November 5-7, 1990

NETWORKING MEETING FOR RURAL COMMUNITIES DEALING WITH HOUSEHOLD HAZARDOUS WASTES

11/6/90

Discussion Summary

Background: The Minnesota Project convened a networking breakfast for people from rural communities dealing with management of household hazardous wastes. The breakfast meeting was intended to provide an opportunity for informal sharing of successes, concerns, and ideas. In short, it was an opportunity to identify and compare the differences and commonalities of rural places in dealing with household hazardous waste.

People Attending: See the attached list of people attending and other interested people. Thirty people with a variety of experience attended the session. Of these, about half lived and worked in rural communities and the other half were working with state agencies or companies working with rural communities.

Questions for Discussion: We asked the following questions.

1. What successes have you had in management of small quantities of hazardous waste?

2. What special barriers do you face as a small town or rural area?

3. What is unique to smaller communities and rural areas in dealing with small quantities of hazardous waste?

The discussion jumped around quite a bit, with one person presenting a barrier, several talking about how they had solved the problem, their thoughts on the significance, and so forth. It was, after all, a networking session.

Highlights of the Discussion: In the interest of capturing the sense of the discussion and retaining some of the detail, we have attempted to highlight a few of the main points that were made.

1. Rural communities share important differences from urban communities.

    a. Attitudes about trash are different in rural communities. People in many rural areas still legally dispose of their trash on their own property. Many, if not most, rural areas have no trash collection. Collection in towns may be a recent addition. Dumping in remote areas is common and hard to

control. The open town dump may have just closed recently -- or may be still operating. Farmers often have pesticides stored on their farms which are as much as 50 or 60 years old. All this concern about trash and especially hazardous waste sometimes seems a little sudden and extreme, and is viewed by some rural residents as just another case of the urban bureaucracy making things more difficult to manage.

b. Cost of programs and funding are an issue in rural communities. Rural communities, towns and counties have a particularly hard time funding programs to collect hazardous waste because of the low population base. Tax revenues and funds from state governments are often insufficient to meet the costs of important state mandated programs -- solid waste competes with health and human services, roads, etc. Collection of hazardous waste seems horrifically expensive considering fairly low participation and perceived unmeasurability of environmental benefits.

A few solutions and approaches to the funding problem were discussed. Some focus on education and reduction rather than collection (Marie Steinwach's Missouri Household Hazardous Waste Project; Tracy LoBianco, Nevada County, California.) Many use volunteers: volunteer fire department (Lanie Hughes, Soldata, AK), community service workers, and more. Others mentioned being able to find creative local sources of funding to help defray costs of educational materials and events, such as service clubs, gambling proceeds, and local businesses.

c. Distances are an issue for rural communities. In almost all cases, distances are an issue. Some communities are one, two, three and four hours drive to large population centers and/or have very low population densities (Alaska; Marquette County, Michigan; Klickitat County, Washington; and many parts of Minnesota.) This leads to higher costs and possibly lower participation in collection programs. Some communities have dealt with this problem with mobile collections (Klickitat County, Washington; Western Lake Superior Sanitary District, Minnesota) and some with permanent collection sites at a location to which rural people come in their normal travels. Examples are the landfill or in town.

Several people talked about not reinventing the wheel, making do with what they had, using models others had developed and tried.

d. Some regulations were seen as barriers to programs that make sense. A number of people talked about regulations being too restrictive. "If the purpose is to get the stuff out of the environment, then we can't let the regulations stand in the way." In specific people mentioned: transportation regulations - we can transport it before we buy it, but not afterwards; problems of having to identify the generator; hazy liability questions; particular problems with farm pesticide collections and regulations.

e. Trust is another issue for rural residents. Rural communities (counties, towns, cities) and regulators (state and federal folks) may not trust one another. Rural residents, farmers were mentioned most often, are likely not to trust regulators and may not trust the county or city. Rural communities and rural residents may not have been complying with regulations for some time. They may not trust or believe in so-called "amnesty" programs. Where they see nothing really wrong with the status quo (pesticides stored in the barn), they may not be willing to risk getting on a list of potential lawbreakers.

Several people talked about increasing participation in programs -- especially in farm pesticide collection programs -- over time, as the word gets around that it is actually safe. People talked about the importance of using local organizations to sponsor events.

f. Effective public education is done differently in rural communities. The city-type advertising campaign with television, billboards, and slick ads doesn't work in rural communities. Lots of people had lots of ideas about what works in educating people in rural communities.

These are a few of them. Rural folks read the local paper and listen to the local radio station. They read their junk mail. Build relationships with the editor and station manager. Use local realtors and utility companies. Use opportunities to educate around collection events -- educate before, during and after. County fairs and local events are natural places to educate. People know one another and use the influence and publicity of local leaders who command respect to lend credibility to programs. Make the program the talk of the town.

Educate the children. Involve teachers. Let teachers teach each other. Use science fairs. Guides, Scouts, and 4-H are good vehicles. County extension and solid waste advisory committees can be very involved in education of both children and adults. They have some great model programs (trashbusters, wastebusters, and more.) Use posters, magnets, toys, eyecatchers.

2. Change is coming in rural communities with respect to solid waste management, and management of hazardous wastes in specific.

People felt that rural communities are addressing management of hazardous wastes -- some with great success, many are still learning and struggling. In getting successful programs started, people suggested finding the one, two or three key people who really want to address the issue. They will be the drive behind getting a program going. In building sustainable programs, they talked about the importance of getting people in the community involved and in making them feel a part of the process.

People talked about the importance of learning from one another, sharing and learning from successes.

3. Next Steps

a. Minnesota Project will summarize the highlights of the meeting and distribute the summary, along with names and addresses, to people who attended the meeting, and to other interested people, including Dana Duxbury and the conference organizers.

b. People attending agreed to send information on their programs to others who attended the networking breakfast. We suggest sending a brief summary, brochures, or information you already have written. Keep it simple or it will be hard to find the time to do it.

c. Minnesota Project agreed to host a networking breakfast at the Household Hazardous Waste Conference next year. All assistance with brainstorming an agenda and format, and hosting the breakfast are welcome.

Submitted by Lola Schoenrich and John Lamb, Minnesota Project

LS#10

Why Household Hazardous Waste Management Is Needed

by

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Why worry about the disposal of hazardous household products? Anyone who has worked at an HHW collection probably has some answer to that question, based on the sheer quantities, variety and age of items that get turned in when people are given the opportunity.

People use a lot of hazardous consumer products and often misuse them, as the three examples in Figure 1 show. When old or unwanted amounts are thrown away, they retain their hazardous characteristics and can pose problems in the waste stream and in the environment.

I would like to briefly review potential problems or areas of concern resulting from the improper handling of household hazardous wastes, following the outline in Table 1.

I. Municipal Solid Waste:

Americans produce about 160 million tons of solid waste per year, of which ten percent is recycled, ten percent is incinerated and 80 percent (130 million tons) is landfilled (EPA, 1989). Those quantities figure out to be 1300 pounds per person per year or 3.5 pounds per person per day; 3500 pounds or 1.7 tons per household per year. That's a lot of garbage.

Amidst the paper, orange rinds, glass and cans, how much is hazardous? Various solid waste sorts have all tended to find that 0.3 to 0.5 percent by weight of municipal solid waste is identifiable items that can be labeled household hazardous wastes (see Cal Recovery Systems, 1985; Rathje et al., 1987). The Seattle-King County area has settled on a figure of 0.33 percent for planning purposes (Local Hazardous Waste Management Plan for Seattle-King County, 1989). Dana Duxbury, in a recent Waste Age article (Duxbury, 1989), uses a figure of 0.5 percent as a national average. What is the significance of a level of 1/3 to 1/2 of 1 percent in municipal solid waste? This is subject to plenty of dispute or difference of interpretation. The EPA-funded study in Marin County, CA, and New Orleans, LA, (Rathje et al., 1987) concluded, "There are significant amounts of hazardous wastes in household garbage, and even

Woman dies in home accident

The Pierce County Sheriff's office is investigating a bizarre accident that took the life of a 38-year-old Tacoma-area woman.

The victim, identified as Phyllis Ward, 38, was found dead about 11:30 p.m. yesterday entangled in the oven in the kitchen of her apartment just south of the Tacoma city limits.

Sgt. Pat Lesnegle reported that the woman had sprayed a cleaner on her oven eight hours earlier and left the element on — according to

Toilet blows its tank due to clean thinking

SATELLITE BEACH, Fla. (AP) — A man says he turned his toilet into a test tube when he mixed two common cleansers and got an explosive reaction.

Hilton Martin told fire officials in this Florida town south of Cape Canaveral that he combined the pellet with Comet cleanser and then added a container of Sani-Flush cleanser before the tank.

The water started boiling and the mixture started steaming.

"About the time that he walked out of the bathroom, the tank on the toilet exploded," said paramedic Mike Whitaker, adding that Martin was lucky to escape injury in what wasn't headlines.

Fire officials say the explosion resulted from some type of chemical reaction.

Sydney McHugh, a spokesman for Procter & Gamble Co., in Cincinnati, said ...

Bug spray backfires, blows out the windows

NORTH LAS VEGAS, Nev. (AP) — A woman trying to rid her home of pests narrowly escaped serious injury yesterday along with two others when fumes from 15 cans of bug fogger ignited and imploded, fire officials said.

"It literally blew the roof off the house," said Fire Marshal Bob Mills. "The windows of the home were blown out, and the roof was knocked an inch out of alignment."

Marilyn Lucas, her teen-age daughter and a friend of her daughter had just gotten out the door when the bug spray was ignited by the pilot light on a kitchen stove, Mills said.

"They weren't injured, but they were scared to death," said Mills. "They could have received very serious burns if they had been in the house."

Bug foggers are designed to be set off and empty themselves of spray while the user leaves the house for a couple of hours.

The bug spray did not kill all the insects, Mills said.

Figure 1. Examples of Problems Caused by the Misuse of Hazardous Household Products.

MUNICIPAL SOLID WASTE
• worker injuries
• equipment damage
• landfill leachate contamination
• landfill air emissions
• incinerator ash and emission contamination
DOMESTIC WASTEWATER
• worker injuries
• pipe damage
• discharge to water or air
• sludge contamination
• septic tank/drainfield groundwater contamination
• septage contamination
OTHER AVENUES TO THE ENVIRONMENT
• storm drain contamination
• hole-in-the-ground groundwater contamination
LONG-TERM STORAGE
• poisonings
• indoor air pollution
• fires and firefighter safety

Table 1. Potential Problem Areas from the Mismanagement of Household Hazardous Wastes.

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the most conservative estimates of the amount discarded for a large community are substantial.... It represents a significant quantity...."

So why worry?

a. Worker injuries. Municipal or private workers who pick up household rubbish are exposed to a variety of things when they dump the containers into their trucks or deal with the refuse at transfer stations or landfills. There have been a number of incidents of injuries to workers, but no national statistics are kept, to my knowledge. A California study in 1982 found that three percent of all refuse collection workers in the state were injured due to contact with HHW mixed in with trash and garbage.

b. Equipment damage. Garbage trucks, shredders and other solid waste handling equipment have been damaged from explosions and fires resulting from the chemistry in household trash. Again, national statistics are scarce, but numerous incidents have been reported, including at virtually every operation that involves a shredder (Popp et al., 1985).

c. Landfills. Eighty percent of America's municipal solid waste is landfilled. EPA's Subtitle D report (EPA, 1986a) concluded that:

- more than half of all active landfills in the U.S. are municipal;
- less than half of these municipal landfills have runon/runoff controls;
- only 1/4 of municipal landfills have groundwater monitoring systems;
- only 15 percent of municipal landfills have liners, either clay soil or synthetic; and
- only 5 percent of municipal landfills have leachate collection systems.

Twenty percent of all National Priority List ("Superfund") sites are old municipal landfills.

Leachate from landfills can be contaminated with HHW chemicals. A number of studies have well documented hazardous metals and organic chemicals in municipal leachate, even those far from industrial sources (see Dunlap et al., 1977; Sabel and Clark, 1984). These and related studies implicate consumer products as sources of these contaminants.

Municipal landfills have also been found to produce hazardous air emissions, including vinyl chloride, a known human carcinogen, at levels violating health standards (Wood and Porter, 1986; Battelle Pacific Northwest Labs, 1987). The source of vinyl chloride appears to be bacterial action on chlorinated solvents such as TCE within the landfill.

d. Incineration/resource recovery. Up to ten percent of municipal solid waste is now burned. Concerns have been expressed about the dioxins and furans that are produced in incineration. Major concerns related to HHW involve heavy metals, especially mercury up the stack and lead and cadmium in the ash. The dominant source of these metals in municipal solid waste is household and automobile batteries (Franklin Associates, 1989). At the Danish hazardous waste incinerator in Kommunekemi, every drum of HHW is opened and inspected to remove all batteries and other potential mercury sources. If this is done at a hazardous waste incinerator with state of the art controls, what should we expect at municipal incinerators?

II. **Domestic Wastewaters**:

The advent of keeping human wastes from being tossed out the window and instead carrying them away with water was a great public health benefit -- at least at first. However, today domestic wastewaters carry more than just human wastes; many modern consumer products are either designed to go down the drain or, because they are liquid, get disposed down the drain. Domestic wastewater consists of 99.9 percent water by weight and only 0.02 - 0.03 percent suspended solids, plus even less of other things. However, that doesn't mean sewage is squeeky clean. Relatively small concentrations of chemicals can be quite significant in the liquid waste stream.

A number of studies have documented heavy metals and organic chemicals in domestic wastewaters (see Levins et al., 1979; Gurnham et al., 1979; EPA, 1982; Cooley et al., 1984; EPA, 1986b). These chemicals include cadmium, lead, mercury, nickel and other metals, plus solvents, paint thinners and degreasers such as tri- and tetrachloroethylene, methylene chloride, benzene, and toluene, pesticides such as DDT and lindane, and plastic components known as phthalate esters.

So why worry?

a. On-site systems -- septic tanks and drain fields. About one-third of all U.S. housing units use septic tanks, cesspool or other forms of on-site wastewater disposal. Human, organic wastes can be decomposed in these systems, with soil used as a final filter , but they are not designed to handle hazardous chemicals. On-site systems are concentrated in the U.S. Northeast, with lesser concentrations in Florida, southern California and the Northwest.

Studies have found organic chemicals passing right through septic tanks and drainfields into groundwater (Tomson et al., 1983; DeWalle et al., 1985; Kolega et al., 1985;

Kolega, 1989). An EPA study (EPA, 1984) concluded, "Only 40 percent of existing septic tank systems function properly....[O]f all groundwater pollution sources, septic tank systems and cesspools rank highest in total volume of wastewater discharged directly to soils overlying groundwater and they are the most frequently reported sources of contamination."

b. Municipal sewerage systems. Publicly-owned sewage treatment systems often have industries and commercial businesses plumbed into them, but usually their predominant customers are households. Sewerage systems employ at a minimum primary treatment, which relies on gravity settling of solids, and usually secondary treatment, which uses bacteria to further break down organic materials; some systems also have tertiary or advanced treatment to remove specific problems such as nutrients. None of these treatment processes were designed specifically for hazardous chemicals. Some do in fact "treat" certain hazardous chemicals, but do so for the most part by shifting them into another medium such as air or solids.

All studies that have looked at contributions of chemicals into municipal sewerage systems have documented residential sources of heavy metals and organics (see previous references). Relative contributions will vary a lot depending on the mix of industries and businesses in the sewerage area, but all systems receive major input from households and can't afford to ignore these sources to keep effluent quality and sludge quality high. While most effects are cumulative from many small sources, it doesn't take much of some things to cause real havoc to a sewage treatment plant. For example, a pint jar of mercury was turned in at one of the Seattle area HHW Round-Ups. If this single household's accumulation had instead been dumped down the drain, it would have contaminated our whole system, causing violations of effluent limits and contaminating sludge, even in Seattle's largest, 125-million-gallons-per-day plant.

III. Other Avenues to the Environment:

a. Storm drains. Urban runoff carries lots of junk off road surfaces into local rivers, lakes or bays. But people also tend to dump all kinds of things down catch basins, gutters or street drains -- out of sight is out of mind. This is an especially common avenue for used motor oil and antifreeze, but also for such things as pesticides, car wash water, gasoline, brake fluid, paint rinse water, masonry acid rinses and just about every other liquid waste from an outdoor activity. Explosions have occurred in drain pipes, usually from gasoline dumping. Fish kills and water pollution are the more common result, since most storm

drains discharge directly into the nearest body of water without any treatment.

b. Holes in the ground. Similar to storm drain dumping, many HHWs are simply disposed on or in the ground. Used motor oil, old, liquid pesticides and paints are commonly handled this way, with resulting opportunities for the wastes to be washed through the soil directly into groundwater. This practice coupled with the vulnerability of its groundwater was one of the driving concerns which resulted in establishment of Florida's HHW Amnesty Days program.

IV. Long-term Storage:

As we all know, many products sit on the shelves for years or even decades. Any HHW collection well illustrates this point. Why worry?

a. Poisonings. Safety in the home, especially for young children, is a reason for concern about stockpiles of hazardous products, especially old, often more dangerous items. Twenty-five percent of Seattle Poison Center's calls and 30 percent of Minnesota's poison calls relate to hazardous products.

b. Indoor air pollution. Recent studies have concluded that indoor household air is often much more contaminated than ambient outdoor air. While there are many reasons for this and many sources of the various indoor air pollutants, hazardous consumer products are an identified source for organic chemical vapors and other contaminants.

c. Fires. Fire safety is an additional reason for concern. Spontaneous fires have been traced back to old products such as volatile solvents, old gasoline and exotic chemicals such as picric acid being stored in homes. Firefighters are becoming increasingly aware of and concerned about their exposure to fumes in the event of a fire. Previously this concern was limited to industrial fires, but increasingly it reflects awareness of the myriad of chemicals stored in the average house.

Summary:

Why are household hazardous waste management programs needed? There is a lot of HHW out there and it can cause human safety concerns as well as environmental concerns. It is becomming increasingly accepted that it would be a whole lot better to manage HHW separately from the regular municipal waste streams. Programs are needed that will manage HHW safely and properly in order to minimize actual and potential problems from the current mismanagement of HHW.

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The Public's View of Household Hazardous Waste
U.S. EPA Conference on Household Hazardous Waste Management
November 7 - 9, 1990

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Background of the Problem

Contamination of ground water, surface water, soil, and air can sometimes be traced to improper disposal of residential household hazardous wastes. Nebraska has 544 communities, many of which are currently faced with inadequate facilities for waste management. Over 250 municipalities with open, unlicensed, unregulated dumpsites have been identified. In 1990, Nebraska had 40 licensed solid waste disposal sites. Of the active open dump sites in Nebraska, approximately 10 per cent are within 500 feet of a private water supply, and nearly 16 per cent are five feet or less depth to groundwater. The potential problems of contamination of local drinking water is apparent.

Studies conducted at the University of Arizona by Dr. William Rathje, Doug Wilson, and Wilson Hughes have identified household products as a possible source of hazardous materials in landfills. Results of studies suggest that although household hazardous waste comprise a small proportion of the total residential solid waste, less than one per cent, total quantities generated per year are high. Each household annually disposes of about five and one-half pounds of household hazardous waste.

Almost every home produces some waste that pose hazards if improperly disposed. The largest proportion of household hazardous waste generally falls into the household maintenance category. However, not every product that falls into these categories contains hazardous materials.

The one per cent of household waste that is potentially hazardous is broken down by weight into household maintenance, 37%; household batteries, 19%; selected cosmetics, 12%; cleaners, 12%; automotive items, 10%; yard items, 4%; drugs, 3%; and hobby and other, 3%. (Rathje, W; Wilson, D.; Hughes, W. 1988). These same categories were used in this study to attempt to identify how householders dispose of the types of waste that might fall under these hazardous waste categories.

Purpose of the Research

The question of what householders do with household waste and particularly household hazardous wastes in areas where there are no organized and/or continuous household hazardous waste collection sites has not been adequately addressed. What are the alternatives available in urban and rural areas and what do people do with their residential waste containing potential hazardous substances? How do geographic differences and population density affect alternatives, financial support of educational and collection programs, and public policy. What are the realistic alternatives available when there are no existing programs within hundreds of miles of the household? Nebraska currently has only one county that performs any type of regular household hazardous waste collection. This county, having 211,000 persons or about 13 per cent of Nebraska's population, has drawn about 6 per cent of the county population to their household hazardous waste collection days. About 1200 persons have participated in 19 collections in the past five years since collections were begun in 1985 (Kube, C., 1990, personal consultation).

How are householders in rural and urban areas disposing of their potentially hazardous household waste? What per centages of rural residents burn their household waste in burn barrels or dump their waste in private open dump sites on their own property or on their rental land? How do rural and urban residents differ in their methods of waste disposal and household hazardous waste disposal? What are householders willing to pay for household hazardous waste collection, if any thing at all? To address these issues and others a random sample survey of 1000 Nebraska households was conducted. The purpose of this paper is to profile the attitudes and reported behavior regarding household hazardous waste management practices of the respondents.

Profile of Nebraska

Nebraska is a diverse state both in population distribution and geography. The population is 1,594,000 persons (1987). About half of the total population lives in the three metropolitan areas of Omaha, Lincoln, and South Sioux City. The average population density in 1987 for Nebraska was 20.5 persons per square mile. Population density varies a great deal within the state. Douglas County, which includes Omaha, has over 1,190 persons per square mile, while some counties in the western part of the state have less than 2 persons per square mile. (Statistical Abstracts of the United States, 1988).

Nebraska covers a large geographic area (77,355 square miles). In comparison, New Jersey (7,787 square miles) is about one-tenth of the size of Nebraska, but has a population of 7,721,000 (1988) compared to 1,602,000 for Nebraska. Nebraska population ranges from as few as 500 to 414,900 persons per county. Cherry county has a population of about 7000 people, but is large enough to have three Rhode Island's fit within its borders. The variation in population density and d. ances to community services may affect differences in waste management and minimization services available to citizens.

Results and Outcomes

One thousand Nebraskans were surveyed using a random sample selection. The response rate was 50 per cent with 494 questionnaires returned. The final sample included 474 householders. Forty-six per cent of the respondents were male, 52 per cent were female. The mean household size was 2.8 with a median of two persons per household. The mean age was 49.8 years with a range of 18 to 89. The mean years of education was 13.6 and a range from 4 to 21 years. The mean household income was between $20,000 to $24,999 with the median and mode at $25,000 to $34,999. Responses indicate that 22 per cent of the respondents rented their home, 78 per cent owned or were buying their home.

Of the 474 respondents, 80 per cent (381) either had access to no land or access to only one or more lots such as the lot their home was on; 18 per cent (86) of the respondents had access to land - they either owned or rented an acreage of less than 50 acres up to 1000 acres or more.[1]

The average costs for garbage removal per month was $7.74 with a range from no fees to $50.00. Seven per cent (33) did not know how much their garbage removal cost. Eighteen per cent (87) reported that removal was at no cost, and 6 per cent (27) reported that the fee was included in their taxes or rent.

Recycling

Twenty-five per cent (119) reported that they did not know the distance to the closest recycling center or pick up point.

[1] Missing cases account for the remainder of the per centage and number to total 100% or 474.

Of those responding (350) to the question regarding the number of miles from closest recycling center or pickup, the mean distance was 14.97 miles with a maximum of 200 miles and a minimum of .1 mile The median distance was 50 miles and the most frequently named distance was 20 miles.

More important than actual distance from the centers may be the perceptions of the distance to a recycling center as a problem. Over 25 per cent (123) of the respondents reported that the distance to the closest recycling center or pickup point for purposes of recycling was a major problem or a problem, 37 per cent (175) reported that it was somewhat or a very minor problem, and 32 per cent (151) reported that it was no problem which could be either because they viewed it as no problem or they did not use it so it was no problem.

Of the 474 respondents, 17 per cent (81) reported that a used motor oil recycling facility was available but they did not use it to recycle oil, 16 per cent (78) reported that they dispose of used motor oil at a recycling facility very little or some; 14 per cent (68) do many times or a great deal - most of it. The remainder or 50 per cent (239) reported that recycling used oil was not available or that it did not apply to them as they did not have a car or someone else did it for them.

In response to plans to recycle motor oil in the future, 14 per cent (68) reported no plans to do or plan to quit, 13 per cent already do and plan to continue; 26 per cent (122) have thought about it or would like to; and 7 per cent (35) have definite plans to recycle motor oil. Thirty seven per cent (174) reported that recycling motor oil is not available or does not apply to them.

Nine per cent (43) reported that they knew that motor oil was recycled at the closest recycling center, 32 per cent (153) said that it was not recycled there, and 47 per cent (222) did not know whether used oil was recycled at the closest recycling center.

Hazardous Waste Collection Program

Of the 474 respondents, 5 per cent (24) reported that they already had a community household hazardous waste collection program. Of the 94 per cent (444) with no household hazardous waste programs, 65 per cent (306) agreed or strongly agreed that their community should start a household hazardous waste program. However, 11 per cent (53) somewhat to strongly disagreed.

Taole 1
Degree of Support for Starting a Community Household Hazardous Waste Collection Program.

Variable Values	Frequency	
	Absolute	Relative (%)
1 Strongly agreed	124	26.2 %
2 Agreed	182	38.4 %
3 Somewhat agreed	85	17.9 %
4 Somewhat disagreed	26	5.5 %
5 Disagreed	21	4.4 %
6 Strongly disagreed	6	1.3 %
Already have	24	5.1 %
. Missing cases	6	1.2 %
	N = 474	100.0 %

Amount Respondents Willing To Pay

Sixteen per cent (76) of the respondents reported they are not willing to pay to get rid of household hazardous waste, and 73 (344) did not know how much they were willing to pay. However, 4 per cent (20) reported they were willing to pay and how much. Of those reporting they were willing to pay and the amount they would pay, the average amount they were willing to pay per pound to get rid of leftover household hazardous waste was .66 cents per pound. The range of reported amounts was from ten cents per pound to a maximum of $2.00 per pound. The low response rate to the amount willing to pay may indicate that people are not sure that they are willing to pay for this service, or that they do not have the information necessary to make an estimate. Comparisons of what the respondents said they were willing to pay to the costs of existing programs across the United States indicate that there is a disparity in amount willing to pay and actual costs per person. The actual costs per person for the collection programs appear to be much larger than the respondents estimates of what they were willing to pay.

Reduction of Household Hazardous Products

In response to whether or not the respondents currently were reducing the type of products purchased that contributes to household hazardous waste, 9 per cent (41) said they do not do, 54 per cent (257) said very little or some reduction, and 32 per cent (149) reported many items or great deal of reduction.

In response to intentions for the future to reduce the type of products purchased that may contribute to household hazardous waste, 34 per cent (159) reported that they already reduced the type of products that contribute to household hazardous waste and or planned to continue. Thirty-eight per cent (180) have thought about it or would like to; and 12 per cent (59) have definite plans to. However, 12 per cent (55) reported that they had no plans to reduce products that contribute to household hazardous waste or that they plan to quit.

Table 2
Intent to Reduce Type of Products Purchased That Contribute to Household Hazardous Waste.

Variable Values	Frequency Absolute	Relative (%)
1 No plans to do or plan to quit	55	11.6 %
2 Already do and plan to continue	159	33.5 %
3 Thought about	91	19.2 %
4 Would like to	89	18.8 %
5 Definite plans	59	12.4 %
Not apply to household	16	3.4 %
. Missing cases	5	1.1 %
	N = 474	100.0 %

What Householders Do With Their Household Wastes

What methods of trash disposal were reported by the respondents and how does that impact on household hazardous waste? Respondents were asked which method they primarily use to dispose of household waste - the method they use for the greatest volume of waste. They were then asked to report the method they used next most to dispose of household waste.

Respondents reported that the their first method of disposal for the greatest volume of their household waste was hauled to a landfill by themselves or someone picked it up to take to the landfill with 81 per cent (383) reporting that this was their primary method of disposal. Eight per cent (40) reported that the primary method of disposal for their household waste was burning it in their own burn barrel followed by 2 per cent (11) who recycle it and 2 per cent (10) who dump their household waste on their own land as the primary method of household waste disposal. The remaining 2 per cent used other methods or composting.

When asked what was their second waste disposal method in terms of volume, 34 per cent (159) reported recycling; 23 per cent (109) reported they used no second method; 15 per cent (71) reported that their waste was picked up or hauled to the landfill, 6 per cent (30) reported burning their waste as a second method, and 5 per cent (24) reported dumping the waste on their own land dump.

Thus, the method used for the greatest volume of their waste is landfilling. However, 8 per cent (40) reported that they burned their trash as their first method and 6 per cent (30) burned their trash as their second method. In addition, 2 (10) per cent reported dumping trash on their own land as their first method and 5 per cent (24) reported it as their second method.

About twenty-five per cent of the respondents reported burning some of their household waste. Of the 474 respondents, 75 per cent (356) reported that no household waste was burned in their own burn barrel or on their own property. Thus about 25 per cent of the respondents were burning between one to 100 per cent of their household wastes.

Table 3
Respondents Reporting Burning Household Wastes

Variable Values	Frequency Absolute	Relative (%)
0 None - 0 % of their household waste	356	75.1 %
1 About 1 % to 10 %	40	8.4 %
2 About 11 % to 25 %	17	3.6 %
3 About 26 % to 50 %	31	6.5 %
4 About 51 % to 75 %	19	4.0 %
5 About 76 % to 100 %	9	1.9 %
. Missing cases	2	.4 %
	N = 474	100.0 %

Do people believe that burning household waste in their own burn barrels is a problem? When asked whether individual households burning household wastes can create environmental pollution problems - six per cent (27) strongly disagreed or disagreed that burning household wastes in burn barrels creates environmental pollution problems; 11 per cent (52) somewhat disagreed; 24 per cent (112) somewhat agreed; and 58 per cent (277) agreed or strongly agreed.

About one-third of the respondents reported that they dumped some household waste on their own property. Sixty seven and one half per cent reported that they did not dump any household waste on their own land. However about one third reported dumping household waste on their own land or their rental land such as in a gully or ditch. The amount dumped may range from some to all of their household waste.

Table 4
Respondents Reporting Taking Household Wastes to Dump Site On Own Or Rental Land Property

Variable Values	Frequency Absolute	Relative (%)
0 None - 0 % of their household waste	320	67.5 %
1 About 1 % to 10 %	73	15.4 %
2 About 11 % to 25 %	31	6.5 %
3 About 26 % to 50 %	21	4.4 %
4 About 51 % to 75 %	13	2.7 %
5 About 76 % to 100 %	14	3.0 %
. Missing cases	2	.4 %
	N = 474	100.0 %

What Householders Do With Their Potential Hazardous Household Waste

Respondents primarily dispose of potentially hazardous waste through placing in the trash can, pouring it on the ground, taking to a commercial landfill, giving it away or using it up, or keeping it in storage as they do not know how to dispose of the product or where. However, also mentioned were other disposal methods such as burning it, taking to a dump site on own property, or pouring it down the drain. A number of respondents reported that they disposed of the products according to the label instructions. However a number of products do not have label directions for storage or for disposal.

Respondents were asked how they disposed of the following selected, potentially hazardous items and reported the following methods of disposing of these categories of household waste. Categories examined[1] included used motor oil, household pesticides, large appliances, solvent-based household maintenance items, solvent-based glues and adhesives, oil-based or alkyd paint, solvent-based household cleaners, and household batteries. Respondents were asked to report their primary current method of disposing of the categories of leftover household products shown in Table 4. Respondents chose from one of 14 methods listed or specified an other method in the event none of the 14 methods listed was used for a particular product.

[1] Based on classifications of common products found in household waste [Rathje, W; Wilson,D.; Hughes, W. (1988) The Garbage Project, University of Arizona]

Table 5
Methods Used by Households to Primarily dispose of Leftover Household Products

Method	HH Batteries	Used Motor Oil	HH Pesti-cides	Large Appliances	Solvent-based HH Maintenance	Solvent-based Glues Adhesives	Oil-based or Alkyd Paint	Solvent-based Cleaners
Bury	3.0% (14)	2.1 (10)	1.1 (5)	.2 (1)	.8 (4)	.8 (4)	.6 (3)	1.1 (5)
Pour on Ground	.4% (2)	13.3 (63)	.8 (4)	.2 (1)	7.0 (33)	1.1 (5)	.8 (4)	1.5 (7)
Place in Trash	56.8% (269)	13.7 (65)	36.7 (174)	6.8 (32)	21.7 (103)	35.0 (166)	32.7 (155)	35.7 (169)
Burn Barrel	2.5% (12)	3.0 (14)	1.5 (7)		2.3 (11)	2.7 (13)	1.5 (7)	2.5 (12)
Landfill or Dump	12.7% (60)	2.7 (13)	9.1 (43)	31.0 (147)	5.3 (25)	7.0 (33)	9.1 (43)	7.8 (37)
Dump Site on Own Property	2.7% (13)	.6 (3)	1.9 (9)	4.9 (23)	1.5 (7)	1.3 (6)	1.7 (8)	2.1 (10)
Pour Down Drain or Toilet		.4 (2)	.6 (3)		1.9 (9)		.4 (2)	1.3 (6)
Keep-Not Know Where to Discard	1.5% (7)	2.5 (12)	3.0 (14)	3.2 (15)	5.3 (25)	3.2 (15)	5.1 (24)	3.0 (14)
Keep-Not Know How to Discard	.4% (2)	.8 (4)	1.1 (5)	1.9 (9)	2.1 (10)	.8 (4)	1.1 (5)	.6 (3)
HH Hazardous Waste Collection	2.5% (12)	5.3 (25)	2.1 (10)	.6 (3)	3.0 (14)	1.5 (7)	2.1 (10)	2.5 (12)
Give to Friend, Donate, Use up	2.5% (12)	7.6 (36)	9.1 (43)	26.6 (126)	11.4 (54)	10.5 (50)	9.5 (45)	13.7 (65)
Dispose of According to Label	2.7% (13)	2.5 (12)	10.3 (49)		7.8 (37)	6.3 (30)	5.3 (25)	6.5 (31)
Evaporate			.4 (2)		5.9 (28)	1.5 (7)	2.3 (11)	.8 (4)
Not Apply as Not Use Product	2.5% (12)	17.3 (82)	16.5 (78)	6.5 (31)	18.4 (87)	22.8 (108)	22.6 (107)	15.6 (74)
Others Change Oil		14.3 (68)						
Other (specified)	5.5% (26)	6.3 (30)	.8 (4)	11.6 (55)	1.7 (8)	1.1 (5)	1.3 (6)	1.1 (5)
Missing	4.2% (20)	7.4 (35)	5.1 (24)	6.5 (31)	4.0 (19)	4.4 (21)	4.0 (19)	4.2 (20)

N = 474

Conclusions and Implications

Additional analysis is in progress to examine relationships of reported behavior and attitudes and education, age, gender, household income, location, land availability, urban and rural residence, etc. to discover if any significant differences exist between groups of respondents and their attitudes, beliefs, actions and intentions regarding household hazardous waste. This topic has applicability to areas of the U.S. similar in population characteristics and provides insight into household hazardous waste management practices.

. Education - additional educational programs are needed related to household products and chemicals and what is potentially hazardous to the environment, safe storage of products being stored, disposal practices and safer alternatives when there are no collection sites available. Respondents indicating that they do not have or use a particular potentially hazardous household waste may indicate that they do not use the product, someone else provides the service, or that the respondent may not realize what products are potentially hazardous, what contains solvents, or that the item is a pesticide.

. Industry - product labeling and consumer information is important. Safety in storage of products and disposal needs to be further addressed. Continued research and product development to address substitution for some of the hazardous ingredients in products is needed.

. Government - realization of the diversity of the population density, economic ability to afford programs, and the geographic differences of the U.S. is needed. Programs that work in dense population areas may not work in sparsely populated areas. Further exploration of the feasibility of programs such as mobile collection units is needed.

. Environment - protection of environment and personal or individual responsibility for understanding the implications of our purchasing behavior, massive consumption and disposal patterns needs to be further addressed.

. Research - additional research to support existing data on disposal techniques, and on the alternatives listed as "safe" alternatives. Are they safe and do they work? Research on product formulations disposal, and continued product evaluation over years of use is needed.

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PUBLICITY/EDUCATION
How to make it happen at the local level

Joan Dotson
League of Women Voters
Redlands, California

I'd like to start by telling all of you how lucky you are: in 1981 there were two Household Hazardous Waste programs in the nation. Both of those were started by citizens groups; not by government and not by industry. They were started by people like you and me.

Now, the reason I said, how lucky you are, is this. In 1984, when we started our Household Hazardous Waste program in Redlands in southern California, conferences like this had not been done.

We had to develop our own publicity ideas and educational material. There was no one to network with, we didn't know what would work and what wouldn't work and toady we are all here as experts to tell you how to do these programs with success. So, if you will just listen to us- the rest is all rather easy.

The next thing you have going for you is that since the mid 80's and especially this past "Earth Day" celebration, public attention has been focused on issues such as household hazardous waste. It is much easier to educate and heighten public awareness once the public is aware of a problem such as household hazardous waste.

I remember when we started our program in Redlands and learned people said to me, "I don't have any household hazardous waste." That's where we had to begin, but the awareness and the sensitivity to the household hazardous waste issue is already there today in the public's mind. I believe all you have to do is get on with your programs now.

First rule, always start planning your program at lease six months in advance. Second, be willing to use unconventional approaches and methods to market your program and communicate your message.

Involve community groups such as non-profit organizations, service clubs, senior citizens, youth organizations, chamber of commerce and of course the schools. Don't forget your local elected officials, they need to be educated too and you need their endorsement too.

Flyers advertising your program are quite inexpensive to design and have printed. Don't forget to ask for donated services when developing your publicity. For instance, a graphic designer might like their name on the flyer to show their concern and contribution for the environment. The print shop might like the same, hoping it will identify them as concerned citizens as well as business people. Don't forget to ask for and use recycled paper. Even

if the cost is greater, it further supports your cause and concern besides helping increase the demand for recycled paper which needs to be further developed.

Please consider printing some of your flyers bilingual. The population in California is changing and we need to make an effort to educate others who may not have learned the English language yet. I'm sure there are other parts of the nation that need to pay attention to this point also.

Contact all of your community leaders, get their support because they are influential and people like to follow leaders and do as they do. Use your city council, go before them and inform them of your efforts. Introduce the volunteers who are working with you. The city will acknowledge you and your efforts in a very public way and that's free publicity for you. That sort of thing is really more effective than a press release I believe.

Tie in with local community activities. There are special shows at shopping malls today. Public service exhibits such as water displays, fire and paramedic displays and many other governmental services. In our community we have street fairs, special day celebrations, sports activities such as bike races, horticulture shows, art fairs and so on. Don't waste these opportunities to expand public awareness about your household hazardous waste program.

Don't forget your public access channel on TV. They are under-utilized in most communities because people don't know how to use them and often the companies don't reach out to make us aware of those opportunities.

Your communities are filled with talented and resourceful people. Find them and use their talents and energies. It will give them an opportunity to do community service and your program will always succeed with lots of public involvement.

One of the goals of our household hazardous waste program was to empower people, "make them feel good that they could do something about the problem". This is very important. Limit the doom and gloom as we call it. A positive program will garner greater public support and acceptance than one that focuses on the negatives of the issue.

Present your household hazardous waste program as easy, convenient, not as something that's difficult to do. Very soon people adopt it as part of their household management. It sort of falls into grocery shopping, going to the cleaners and drop off at the household hazardous waste collection center kind of thing.

The most important fact I can leave with you is this - and I quote Leslie Lewis from the Connecticut Department of Environmental Protection; "education and publicity is an ongoing part of your household hazardous waste program". In other words, it is not something you do once and repeat at intervals. No publicity/education program is perfect. Even if it is, the public's attitudes are constantly changing which will dictate adjustments in your program. Encourage feedback and establish an evaluation process for your program. This will give you the information you need to update your publicity/education program. What could be easier?

In conclusion everything you need to know for a successful education/publicity program is available to you here at this conference. Take advantage of it and us and we guarantee success for you and your program. Remember, if you go home without information its your fault, not ours.

U.S. Environmental Protection Agency

Household Hazardous Waste Management Conference

November 5 - 7, 1990 San Francisco, California

TYPES OF PROGRAMS

Gina Purin
NORCAL Waste Systems, Inc. San Francisco, California

There are now quite a variety of household hazardous waste models available to local governments and private companies. Some are periodic, some are permanent, and some are combinations of the two. Some are at fixed locations while others are at rotating sites. Some are operated by private companies, others by government agencies. Some collect all types of waste while others limit their collection to specific waste streams or target audiences. Some offer door-to-door pick up of wastes while others do not; and, some offer service on an appointment only basis while others are simply available on a scheduled "walk in" basis.

The following takes a look at 15 different types of collection programs and very briefly highlights a few of the hundreds of programs existing across the country that fall within those types. Some of the programs have been mentioned in Household Hazardous Waste Management News, the national newsletter distributed through the Waste Watch Center in Massachusetts. Other programs are not as well known.

I want to make it clear that the programs I'm mentioning are not the only programs of their type that exist throughout the country. They are simply those programs that are represented here at the conference or those programs that I have been fortunate enough to make contact with before the writing of this paper!

One Day Events or Periodic Programs

This is really a misnomer because some programs are considered "one day" events or roundups but they are held for more than a day. "One day events" distinguish themselves by not keeping the waste stored for long periods. Often, it is removed within 24-144 hours following the day's collection event.

"One day" events can really produce surprising turnouts - a reason why many communities are fearful of holding them. **Los Angeles County and the County Sanitation Districts** sponsored a program at the Rose Bowl in Pasadena on Saturday, April 28th (the week following Earth Day). Forty-two hundred (4,200) people showed up in a six hour period. The following week they held a program in nearby Long Beach and 3100 people showed up. Today, whenever they hold a program they consider 2000 households a small turnout. Interestingly, they do little advertising. Over 80% of those bringing in waste said they heard about the event in the newspaper: one ad was placed a week before the event! The other interesting thing is that people had to wait an average of 15 minutes to be served - in spite of the large turnouts. Initially (during the first hour or two), the wait was about an hour because people had come early and lines were already forming before the site was open - a typical occurrence for "one day" events.

Corporations - Employees Only

Some major corporations like **Honeywell** in Minnesota and the **Hercules Chemical Company** in Delaware have gotten into the act by sponsoring collection events for their employees only. A new twist to a "one day" event!

Recycle Only Days

"Recycle Only Days" can actually be held as ongoing permanent programs or as special events. "Recycle only days" are exactly what the name implies - only recyclable items are taken - things like antifreeze, latex paint, used oil, and car batteries.

As a special or "one day" event, **Sacramento County (CA)** was the first to introduce the concept of "recycle only" days. This was done in an effort to reduce household hazardous waste collection costs and to raise community awareness on the whole recycling concept. While the county uses a private contractor to operate their hazwaste collection days, city and county staff and fire department volunteers are used for "recycle only" days. Conducted in cooperation with the City of Sacramento, the hazwaste collection days are held one month and the "recycle only days", the next.

County and City staff are used to consolidate latex paint and used oil. A used oil recycler is on hand with a vacuum truck to suck the used oil out of 55 gallon drums and to transport it offsite following the day's activities. The latex paint is stored at the city landfill until the following Monday when it is taken to a local retail paint outlet (Standard Brands)

for transport to their paint manufacturing facility in southern California for recycling. A battery recycler is also on hand to unload batteries from people's cars and to place them in their truck for transport to their recycling facility.

Contra Costa County's (CA) 18 cities co-sponsored a "recycle only day" at seven locations in their county on the same day. Four thousand (4000) households participated bringing in 16,000 gallons of used oil, 2,400 batteries, and 8,000 gallons of latex paint. Volunteer staffing was provided through a combination of city/county staff, local elected officials, community groups and industry. Additional co-sponsorship with the county's major newspapers gave front-page coverage to the larger issue of household hazardous waste.

As permanent programs, local garbage companies are using the "recycle only" idea as an avenue of offering their customers year 'round collection of used oil, batteries, latex paint and/or antifreeze. Vallejo Garbage in **Vallejo, CA** (a NORCAL subsidiary) is offering the collection of latex paint as a permanent service while Vacaville Sanitary Service (NORCAL subsidiary) in **Vacaville, CA** is offering the collection of latex paint through a one day event. Both companies have been accepting car batteries and used motor oil for several years.

Drop and Swap

Some programs offer "drop and swap" for particular products.

The **State of Vermont** was the first to do a "drop and swap" event for latex and oil-based paint (September 1989). Paint was accepted from area households, separated by color and type, and then offered to the general public in original containers. Leftover reusable paint was consolidated and repackaged for later distribution. Unusable paint was treated as a hazardous waste and burned as supplemental fuel. (PCB containing paint - found in some solvent based paint - was sent for destructive incineration.)

In recent programs, because of EPA's recommendation to limit the use of mercury in interior latex paint to below 200 ppm, the Vermont program is only allowing interior paint to be distributed in their original containers if the manufacturer could provide assurances that their particular brand of paint does not contain mercury and has not contained it since the early 1970's, for instance.

Based on Vermont's program, **Snohomish County, WA** conducted a large scale one-day drop and swap event for paint and paint related items in April 1990. (The following week a full HHW collection was held for all other products and paint as well.) Reusable latex and oil based paint brought to the event was sorted by type and made available in

original containers to the general public throughout the day. Other products and nonreusable paint were disposed of as hazardous waste by a private contractor.

This Fall, Snohomish County is holding a mobile HHW collection in four locations throughout the county over a six week period. A paint sorting and bulking operation is set up adjacent to the collection tent but staffed separately from the hazardous waste contractor. Non-profit organizations and community groups were contacted in advance and those needing over 10 gallons of paint were able to make appointments to pick up reusable paint. In the first six days of the collection, over 700 gallons of reusable paint were given away.

In **Minnesota**, 40% of the usable paint is given away "as is" - in the original containers without being consolidated or reprocessed.

Paint isn't the only product given away in "drop and swap" activities. As indicated by the slides, all types of usable products, currently available for over the counter purchase, are given away through one-day household hazwaste events or permanent facilities. At such programs, the "drop and swap" title gives way to "reuse programs". Here we see an example of a reuse program at a permanent facility in San Francisco; and, the next slide shows "reuse" at a one day event held in Vallejo, CA.

Retail Trade-In

Another version of a drop and swap activity is the retail trade-ins.

Some communities (by law, all communities in California) require retailers who sell car batteries to take the old one back when a customer purchases a new one.

Retail Drop-Off

Unlike the retail trade-in programs where one thing is exchanged or swaped for another, the retail drop-off center simply accepts certain items.

Used oil, for example, is accepted from the public at shops such as Sears, Chief Auto Parts and Pep Boys.

Regular household batteries are accepted in boxes or plastic containers by stores who then ship them off to a recycler.

In European countries, old drugs and medicines are voluntarily collected by pharmacies and deposited with pharmaceutical wholesale companies or sent to a hazardous waste management facility.

Targeting Specific Wastes or Audiences

Some communities conduct roundups or amnesty days for specific waste streams like waste from schools as was done in **Alabama**. Other programs target farm waste.

Thirty five states now have or have had farm waste programs. In **Michigan**, the State Department of Agriculture has taken the lead to identify and implement eight collection days for farm waste scattered throughout the State. One event has been held in 1990 so far and 29 farms brought in an average of 300 pounds of waste each. This amount was consistent with a program held in 1989. Interestingly, it is consistent with the amount of waste brought in by Conditionally Exempt Generators in Alaska's program. At the end of each event, the waste was brought back to the TSDF of the contractor hired to do the program.

Door-to-Door Pickup

In a door-to-door program, the waste is picked up at the door, on an appointment basis, as the name implies. It is different than curbside collection which will be discussed later.

In 1988-89, the **City of Los Angeles** attempted a very comprehensive collection effort where refuse collectors were trained by a private contractor to accept, sort, and package the HHW from area households, utilizing a retrofitted City "bulky item" truck. After each day of collection, the HHW was taken back to a City storage facility permitted by the State Department of Health Services for the HHW collection project. The waste was subsequently picked up (within 90 days) by a hazardous waste hauler and taken to an appropriate TSDF (treatment, storage, disposal facility). Although the program was successful, it was costly. The City is now proposing a pilot HHW drop-off (instead of door-to-door) collection facility to serve a designated area of the City and a mobile HHW collection program City-wide which can be evaluated to determine a long range HHW strategy.

As part of any HHW collection effort, the City has offered and will continue to offer door-to-door pickup from the "elderly and/or handicapped". This door-to-door collection is not advertised but over 100 calls per year are received from people who simply want to get

rid of their HHW and don't have transportation or are house bound. The City keeps a record of these calls and contacts them prior to the scheduling of a one-day roundup to set up an appointment for pickup.

METRO Toronto operates a "Toxic Taxi" for their door to door program. They will collect waste from the elderly, handicapped, or anyone who cannot deposit their hazwaste at one of 10 collection depots located throughout Toronto. The taxi service operates 5 days per week, all year long. The city is divided into 5 sections and when someone calls, they are told when a collection will be available in their area and an appointment is made. One driver and one technician go around to collect the waste on a retrofitted truck. When the waste is collected, it's sorted and packaged on the truck and taken back for storage at one of the permanent collection depots located throughout Toronto.

Curbside Collection

Curbside collection refers to products left at the curb.

In **Ontario, the Ministry of Environment** is looking at implementing a pilot program in 1991 using locked yellow boxes for curbside pickup of household hazardous waste. (In addition, thought is being given to having special containers placed in large office buildings to collect dry cell batteries. This program is being looked at because one of the largest municipal landfills in Ottawa recently banned the acceptance of dry cell batteries.)

Curbside collection of household hazwaste is only being done - at the moment - for select products. Used oil, for example, is collected curbside by many California cities. The city of **Mountain View, CA** is an example of this type of program. (The program is operated by a NORCAL company.)

In **Hennepin County, Minn**, dry cell household batteries are collected in the City of Minneapolis along with other recyclables that are left curbside. People put them in baggies and place them on top of the recyclables box that is provided to them by the City for the recycling of their glass, aluminum, and newspaper. The collected batteries are then turned over to Hennepin County's Vocational Services Program who sort them according to type. Those batteries that are recyclable are sent for recyling and those that cannot be recycled are landfilled at a hazardous waste landfill.

Surburban County residents or Minneapolis citizens who do not have curbside collection of glass, aluminum, etc. obviously do not have collection of batteries either. These people are served through a series of battery drop off centers located at select area drug stores shopping malls and soon - libraries.

Hennepin County is also involved with a pilot program to test the effectiveness of alternative collection containers. Approximately 7000 households have been given a plastic bucket market specifically for battery collection. The buckets are placed out along with the regular recyclables bin and the driver empties the batteries into a larger bin that is placed on the recycling collection truck.

Permanent Facilities

The permanent site is exactly what its name implies - one or more permanent structure serving one or more communities.

An example of one permanent site serving one city/county is the **San Francisco Facility**. Open to the public Thursday through Saturday, the facility is operated by a private company (Sanitary Fill Company - a NORCAL subsidiary) and sponsored by the City and County of San Francisco. In its second year of operation, the facility is averaging 160 cars a week. No need to go into detail on this program since City representatives and the site operator will be part of several panel discussions; and, they will be offering tours of the facility.

Not all programs are as large as San Francisco's. Some simply use a a type of specially designed hazardous materials storage shed for their permanent collection efforts. This is the type of facility that will soon be in use in two small rural communities in California - the cities of **Oroville and Gridley**. (Operated by NORCAL subsidiaries.)

Another example of one permanent facility serving two counties is nearing completion in a rural county in California. This bi-county facility will serve residents of **Yuba and Sutter Counties** and is operated by the local garbage company (Yuba Sutter Disposal Inc., a NORCAL subsidiary). One county takes the other's solid waste and the situation is reversed for household hazardous waste. The facility will serve residents one day a week. It has a rather unique design: drummed waste is placed in large metal containers (like roll-off boxes) and set in the facility. The design was used to curb community concern over what would happen in the event of a flood. (Several years earlier, the whole area had been hit by torrential rains.) In the event of a pending flood, the boxes would be hitched to a truck and removed. A special fire suppression system was installed in each of the bins.

Yet another version of a permanent collection system involves the **state of Minnesota** where seven permanent facilities are open two days a week - generally on a weekday and Saturday. Each of the seven permanent facilities serve several Minnesota counties -i.e., they're really permanent regional facilities. Each of the 7 facilities also offer about two household hazwaste roundups or one-day events per year in each of the counties served

by them.

In fact, one of the 7 permanent facilities has a trailer (in addition to the permanent facility) that is used for the one day collection events held in the sparsely populated areas of the region it serves. The trailer (a roll-off box on wheels) is used to bring equipment and supplies to the one day event and to haul the waste back to the permanent facility. At the one day events, the sorting and packaging of the waste is conducted in County highway shops.

Orange County, CA is also involved with implementing multi permanent sites. Six have been proposed: 1 is currently operational, 3 are scheduled to go on line before the end of the year, 1 is expected to be operational by spring, and the final site will be operational some time before the end of 1991. The site that is currently operational is open to the public 5 days per week - Tuesday through Saturday. It opened in July and quickly started serving about 100 households per day. They now average about 70 cars per day and expect the participation rate to drop as their other sites open and as people realize they can procrastinate. The County does virtually no advertising for the program and people keep coming - learning about the facility mostly through word of mouth. The entire program is operated by the County on public property.

Satellite Sites

Satellite sites are really an extension of a permanent facility and are "supported" by them.

San Bernardino County in California is the oldest program that involves the operation of one permanant main facility serving satellite sites - in this case, six sites. These satellite sites are staffed by city or county personnel who lab pack the wastes but do not consolidate materials (other than used oil) or test unknowns. Materials to be consolidated (paint, antifreeze, solvents) or tested to determine a hazard category are sent to the main facility. The main facility also accepts waste from the public in addition to doing all the consolidation and "hazcatting" for the seven sites. The permanent facility also supplies the satellite sites with any equipment they may need.

Mobile Sites

King County, WA is the first county to run a mobile collection program sponsored by a local government. (The state of Florida ran "Amnesty Days" as a type of traveling road show beginning in 1984.) It received the GRCDA's 1990 award of excellence. The King

County program makes 24 stops a year throughout the county. Each stop lasts for a two week period. In the two week period it is open to the public on Thursdays, Fridays, and Saturdays. During the weekdays, they are open until 7 p.m. The sites are operated by a private contractor. At the end of each collection day, the wastes are removed from the site and taken back to the contractor's TSDF.

The mobile site includes an office as well as transportable security fencing. Collection sites can be shopping malls, fire stations, church lots, drug store/grocery parking lots, etc. In over a year of operation, they collected over 1 million pounds from 17, 500 vehicles.

Riverside County in California also offers a type of mobile program. A mobile unit, pickup truck, and van visits each of the five supervisorial districts in the county for about a one month time period. During this time, the site remains open to the public every Tuesday, Wednesday, Thursday and one saturday per month. Unlike King County, the program is operated by county staff with the exception of the hauler.

The programs are held in conjunction with the county's Trash Buster program or annual clean-up days. It's where all residents are given a free opportunity to get rid of anything they want from their homes. Because hazardous wastes traditionally were not accepted by the Trash Buster program, it made sense to offer the household hazwaste cleanup days at the same time.

While Riverside and King counties takes their mobile collection program to various locations for extended periods of time, **Klickitat County**, WA has a mobile program where they visit eight communities or towns in three days: three sites on one Saturday, three the following Sunday and 2 more the next Saturday. They repeat this process twice a year. Each of the sites are open about 1 1/2 hours. They can make a quick entrance and exit because the communities served are very small. Some towns have 35 people while the largest has a population of 3,000.

Most of the collection, sorting and packaging of the waste - and all of the transportation and identification of unknown material - was handled by a private contractor.

When the collection event is over in the first town served, the waste is then placed on a truck and transported to the next town. At the end of the day, the waste from the two or three communities served that day is brought back to a County facility where it is stored until the entire project is over - i.e. until all eight communities have been served. The waste is then transported to its appropriate disposal destination.

Conditionally Exempt Generator Waste

A few household programs were done in conjunction with collection of waste from conditionally exempt generators (CEG) - either on a permanent or periodic basis.

The **County of Santa Barbara** in California holds programs for HHW and CEG waste five times per year at rotating sites within the County. In accordance with California law, amounts transported to the program were not to exceed 5 gallons or 50 pounds. Although wastes from households and small businesses are collected on the same day, the businesses use a separate line because it takes longer to accept waste from businesses than from households. The waste accepted from each business must be inventoried and a receipt issued before the business leaves the site. Should a business need to demonstrate to a government agency that their waste was properly disposed, the receipt will provide such proof. In addition, the businesses are charged a fee for the service. Even though businesses use a separate line than households for dropping off their waste, the business waste and household waste is consolidated and/or lab packed together. Separate recordkeeping is maintained for the waste from businesses. A report identifying the business that participated, along with the type and quantity of waste received from each business, is sent to the California Department of Health Services (the State regulatory agency for hazardous waste management) after each event.

Fees charged small businesses cover at least 75% of the transport and disposal cost. The actual program absorbs 100% of the labor costs for managing hazardous waste. All waste is removed from the site within 3 days. The service is free to households. The entire program (for both households and CEGs) is subsidized through an increase in landfill tipping fees. Collection, sorting, packaging, and transportation is provided by a contractor.

The **City of Anchorage** in Alaska has a permanent site that accepts household and conditionally exempt generator waste (i.e. those businesses generating no more than 220 pounds of hazardous waste per month and accumulating no more than 2,200 pounds). The 6,000 square foot facility is owned and was constructed by the Municipality of Anchorage and is located on city property. It is operated by a private contractor. The program is funded through a combination of tipping fees, residential sewer bills, a $5.00 gate fee for households and a charge levied on small quantities of waste from businesses based on the type and quantities brought in. In the first year of operation, businesses have paid an average cost of $300 to drop off their waste.

The facility is open 5 days a week (Tuesdays through Saturdays) and a satellite site at the area transfer station (household hazwaste only) also serves as a collection point on saturdays - although no processing of the waste occurs at the transfer facility, only collection. The waste is transported back to the main facility which includes a staging area for consolidating waste and lab packing, 2 flammable storage rooms, one corrosive

storage room, one poison storage room, and a laboratory in its facility design. Because of extreme cold, the satellite site and the main facility are heated year round.

The **State of Vermont** recently passed legislation requiring every region to identify CEG waste. An unregulated hazardous waste component is required in each solid waste plan by January 1992.

Education

Whether communities have collection programs or not, education is extremely important. The community needs to be educated prior to a collection event to inform them WHY they should bring their products to the event and of course, where to bring them, how to package them, etc. Education needs to continue during and after events - even in the absence of programs - to serve as a reminder of the potential hazards associated with consumer products containing hazardous materials. In the longer term, education can affect behavior changes. In a questionnaire presented to participants of the San Francisco Permanent Facility, 72% said they are now buying less hazardous products as a result of the program and 89% changed their disposal practices. To help promote use of the San Francisco Facility, the two refuse collection companies (Golden Gate Disposal and Sunset Scavengers) pass out brochures, on the facility, to customers. When household hazardous waste is found in a person's garbage can, they refuse to take it and tag the product with a card that tells the owner where to safely dispose of the waste.

The **Household Hazardous Waste Project for the State of Missouri** is a sterling example of a household program focusing entirely on education. Before collection programs existed in Missouri, this project was up and running. The project provides area residents with information on how to safely identify and minimize use of household hazardous products. They also serve as a clearinghouse and referral service, are involved with youth education activities in the schools, offer workshops to train people as resources and speakers, and staff a telephone information line. They also produced a guide to hazardous products around the home.

By the way, it was the Missouri program that brought the recycling of mercury batteries to the attention of so many people at the EPA household hazwaste conference two years ago.

Again, education is the single most important ingredient of ANY household hazardous waste program. It's the foundation on which all implementation programs should be built..

Appointment vs. No Appointment

Two other types of facilities have surfaced that bear a quick mentioning. One is the facility that offers "an appointment only" schedule and the other is a facility that offers residents an "open schedule" during operating hours. In other words, no appointment is necessary. There are advantages and disadvantages of both. We don't have time to address them right now but, more than likely, you will hear about this in presentations given in other sessions.

In conclusion, I guess I'd just like to say that it's obvious there's a great many programs out there and every one of them seems to put a new twist to its operation or to personalize it some how.

Today I mentioned a few programs. Please remember that these are examples and not meant to detract from the great work - and often similar work- that is being done by many, many other programs across the country and elsewhere.

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Used Oil
Federal Legislation

Fran McPoland
Legislative Assistant
Congressman Esteban E. Torres

Household Hazardous Waste Management Conference
November 5 - 7, 1990
San Francisco, California

There is an important, if not highly publicized environmental problem, that exists in every community in the United States -- improper disposal of used lubricating oil. Each year, over 426 million gallons of used oil are improperly disposed into the environment - the equivalent of more than 35 Exxon Valdez oil spills. Nearly one-half of that is as a result of improper disposal by "do-it-yourselfer" oil changers. Only 30 percent of the lube oil sold in America is properly recycled.

There are many complex issues involved with the problem of used oil. Central to the debate is the question of whether used oil should be regulated as a hazardous waste under the Federal Resource Conservation and Recovery Act (RCRA). Some people believe that consideration should be given to the extra costs which the hazardous waste designation inevitably brings with it. There are people, both in and outside of the environmental community, who are sharply divided over the question of whether the additional costs and difficulties of hazardous waste regulations, over and above stringent management standards, would itself provide a further disincentive to recycling of used oil.

There is another school of thought that holds that we must put into place additional economic incentives for oil and other waste materials to guarantee that they get recycled - whether or not used oil is legally listed as a hazardous waste.

During the recently ended 101st Congress, the House of Representatives reported out of the Subcommittee on Transportation and Hazardous Materials of the Committee on Energy and Commerce, a bill which directs EPA not to list used oil as hazardous, if it is recycled. This legislation was originally introduced as H.R. 1593 by Congressman Ike Skeltyon (D-MO). H.R. 3735 goes further than the original Skelton bill in that it imposes management standards similar but not identical to the management standards that would be imposed if the used oil were a 'listed hazardous waste'.

H.R. 3735 would require that gas stations and other collection points maintain records and receipts of used oil transferred to used oil haulers. The licensed haulers, who are the only ones who would be

legally allowed to take the used oil, would have to obtain an identification number, as well as maintain records and insurance, under the Hazardous Materials Transportation Act. The hauler would have to take the oil to an oil recycler unless he wanted to pay to take the material to a hazardous waste disposal facility. (If sent to a disposal facility the used oil would automatically be treated as hazardous under the regulation proposed in H.R. 3735.) The oil recycler would be required to maintain records of all incoming oil along with tests of whether the used oil was contaminated. Oil which has excessive (greater than 3,000 parts per million total halogens) contamination could only be handled by a facility having a hazardous waste permit under RCRA.

Most recycling facilities in the United States would qualify for a "class permit" which means that after they certify that they have met the conditions established in the law, they will be automatically "deemed" to have a permit for the oil recycling. The Administrator of EPA would have the responsibility to see to it that the facility was, in fact, in compliance with all applicable rules and regulations.

If on the other hand, used oil were to be regulated at the federal level as a hazardous waste, several of the above regulations would become considerably more stringent (and increasingly more costly). First, the gas station or other collector of used oil would have to fill out a hazardous waste manifest for every load of oil transported. Second, because they are now handling a hazardous waste, some gas stations, retail stores and community/county collection programs may face higher insurance costs or even the prohibition against taking the oil from the "do-it-yourselfer." The used oil hauler would also complete a hazardous waste manifest and would have to complete training and licensure for hauling hazardous wastes. The used oil recycling facility would complete a hazardous waste manifest and would have to obtain a permit under Sec. 3005(c) of RCRA with additional public participation, insurance and closure requirements.

Whether or not used oil is a 'listed hazardous waste' there are still economic barriers to getting the oil recycled. If the gas station has to pay to get rid of their used oil, the station owner will not be inclined to take used oil from the "do-it-yourselfers." Many people believe that, since right now, we are only collecting five percent of the DIY oil, it is necessary to put some economic incentives into place to encourage the gas station owner to collect as much oil as possible....because he can sell it.

Congressman Esteban E. Torres (D-CA) introduced legislation (originally known as H.R. 2648, The Consumer Products Recovery Act) which has been included in H.R. 3735. These provision, which have come to be known as the 'recycling credit system,' require the manufacturers or importers of lubricating base stock to guarantee that an annually increasing percentage of the product that they produce is recycled. The manufacturers can fulfill their obligation by either taking back the used oil themselves (for re-refining) or by purchasing recycling credits from a licensed reprocessor or re-refiner. For every gallon of used oil that is recycled, the recycler will be

entitled to issue and sell a 'recycling credit.' In this way, the recycler will have an income from the sale of the used oil product as well as a second income from the sale of the recycling credit. Thus enabling the recycler to either lower the cost of his product or expand capacity in order to take more used oil in for recycling. This would cause a constant balancing of the system.

Mr. Torres' used oil credit system has garnered a great deal of support, both from industry, which see economic as well as public relations potential, and the environmental community, which see the credit system as the only way to guarantee that an increasing amount of used oil will be recycled. However, a problem that has arisen, is that if used oil is a 'listed hazardous waste' the refiners will not be able to collect used oil to insert in their refinery process. Under RCRA if used oil were a listed hazardous waste and the refinery was to mix the used oil with virgin oil, than the entire product would be deemed to be 'derived from a hazardous waste' and thus, be itself a hazardous waste. Also, the entire refinery would have to be a permitted hazardous waste facility. This causes major problems for the refineries. Essentially, it means that any product, like gasoline or vaseline petroleum jelly, could be considered to be a hazardous waste. As a result of this problem, the refineries will probably refuse to handle used oil. Unfortunately, if America is going to make a serious effort to recycle used oil, the capacity of the refineries is essential.

So, this is the problem. Do we insist on listing used oil as a hazardous waste under RCRA or do we compromise in the name of being able to collect more used oil into the system? This is the problem that Congress will continue to wrestle with as we approach the 102nd Congress and the inevitable reauthorization of RCRA.

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

SAN FRANCISCO, CALIFORNIA
NOVEMBER 5-7, 1990

ALAN D. GRESSEL
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MANAGEMENT OPTIONS FOR USED OIL DRAINED BY HOUSEHOLDERS

Used oil drained from engines by automobile owners constitute a major portion of the liquid wastes generated by America's households. Although used oil is managed as a hazardous waste here in California, this issue remains unresolved on the federal level. Regardless of your opinion on the nomenclature of used oil, the options for management of this waste derived raw material are the same. The major portion of used automotive oil consists of hydrocarbon molecules identical to those that constitute base stock into which additives were blended to produce the multi-viscosity detergent oil used in all modern motor vehicles. The decision to drain engine oil is based on the degree of contamination of these molecules with a combination of unburned fuel, metallic particles from engine wear, acids resulting from sulfur and other fuel contamination, water condensed from the by-products of burning fuel, particles of dust drawn into the engine with the air needed to combust the fuel, and those hydrocarbon molecules that have reacted with oxygen, sulfur, phosphorus, and metals.

Modern engine oils are specifically designed to hold all of these contaminants in suspension so that they can be drained from the engine with the used oil, leaving the engine free from precipitated sludge and varnish. Engine manufacturers suggest an oil change frequency sufficient to insure that the used oil is removed from the engine before the contaminant level overwhelms the ability of the detergent-dispersant additives to keep the contaminants in suspension.

Management options for drain oil must consider the fate of both the oil and the contaminants, organic, aqueous, and metallic. Unfortunately, the more efficient the oil refiner is in devising additive packages that enhance the ability of the motor oil to suspend greater volumes of contaminants, the more difficult becomes the job of separating those contaminants from the undamaged oil molecules that are capable of reuse. The better the additive package, the greater volume of contaminants that must be disposed of per gallon of recycled oil.

No matter what end use is intended for used automotive oil, the fate of the contaminants must be considered. If the used oil management program intends to re-refine the automotive oil for reuse as an engine lubricant, all its contaminants, fuel, water, airborne dust, engine wear metals, and partially oxidized oil components must be removed during the re-refining process. To the best of my knowledge, no current technology is available to accomplish the removal of these contaminants without removing, in addition, the polymer additive and other organic chemicals that are added to the lubricating oil base stocks during the formulation of modern motor oils.

The recycling of used automotive oil for use as a fuel or in such other non-lubricating oil uses as flotation additives, paving asphalt, parting compounds, lubricating greases, or any other end use of which I am aware requires the removal of some, if not all, of the contaminants present in the used oil drained from automotive engines. Except for the currently frowned on disposal options of incineration and dumping on the ground, in the garbage, or down the sewer, any used oil management program encompasses at least partial removal of water by settling and solids by simple filtration.

We have now reached the recycling dilemma. The higher and better the intended reuse of the used oil, the more contaminants that must be removed. The more contaminants removed, the more hazardous waste that require proper disposal. I here use the term hazardous waste for the contaminants removed from used oil advisedly, because a used oil or the portion thereof intended for disposal, instead of recycling, will test hazardous by TCLP due to benzene, chlorinated solvent and/or lead contamination at levels above TCLP limits. A lower use, such as industrial fuel, can beneficially reuse a greater percentage of the used oil and not result in the need for so much (up to 40%) waste disposal as will re-refining.

Contaminants removed from used oil consist of aqueous waste, hydrocarbon fuels, and organic sludge. At least from the point of view of land disposal, each of these contaminants, if for no other reason, would be disqualified from direct burial because they are not solids, but liquids. Also, all will require substantial pretreatment to meet land disposal standards, if not now, then after the adoption of the land ban standards for the new TCLP organics.

Once the landfill is eliminated as a disposal option for the contaminants from used oil, the waste manager is left with deep-well injection or wastewater pretreatment before disposal to the POTW for the aqueous waste. Burning for energy recovery or incineration are options for disposal of the organics, both the light fuel and the contaminated additive waste sludge. These hazardous waste disposal issues, are common, except for degree, to each recycling, reuse, or re-refining management option. However, the level of contaminants removed varies considerably with the intended reuse.

The production of lubricating oil base stocks from used motor oil requires the use of the most raw material per recovered gallon. At least 30%, and often as much as 40%, of the used oil must be removed in the re-refining process. Eventually much of this material must be blended into a fuel for use in energy recovery or burned at an incincerator. Even in the production of fuel oil from used automotive oil, depending on the quality and process selected, there is a substantial variance in the percentage of recovered product and the percentage of waste requiring disposal. On-spec oil for use in home heating on the east coast requires substantial treatment or dilution to bring the finished oil into specification for metals, sulfur, and moisture. Reuse of crankcase oil in a used oil heater apparantly produces little contamination. However, the burner in which the used oil is burned accumulates metals and oxidized organics.

Perhaps the most efficient management of used oil which leaves the least residues of hazardous waste for disposal is burning for energy recovery in industrial furnaces. When used oil is burned in a boiler, even a large industrial boiler, unburned residues resulting from unremoved contaminants, such as airborne dust and metallic residues of engine wear, form ash which either remains in the furnaces on the heating surfaces or passes up the stack and is released to the atmosphere unless it is caught in a pollution control device installed on the boiler. However, when used oil recycled from automotive lubricants is burned for energy recovery in a furnace, such as an iron-making blast furnace, a cement or lime kiln, or an asphalt pavement dryer, the metallic and other inorganic residues that are not combusted into carbon dioxide and water are absorbed into the product being manufactured in the furnace. Tests performed by both government and industry have demonstrated that lead as well as silica, iron and other similar metals are incorporated into the iron, the slag, the cement, the cement kiln dust, and the asphalt pavement manufactured in industrial furnaces. Although these industrial furnaces are equipped with air pollution control devices such as bag houses and wet scrubbers, it is good news that up to 95% or more of heavy metals end up, not in the air pollution control device, but in the manufactured product made in these furnaces. After all, both bag house dust and scrubber sludge are solid wastes, usually hazardous wastes, and must, of course, be disposed of properly.

Based on my 40 years in the business of re-refining used oils, recycling oily wastes, and hazardous wastes, I have become convinced that burning for energy recovery in an industrial furnace is one of the best management option for used oils generated by automobile owners' oil changes.

PROJECT ROSE
Janet Graham

Proje[illegible] R.O.S.E.

Alabama's borders extend from the Tennessee Valley to the Gulf of Mexico. With the exception of Birmingham and metropolitan area around Mobile, Montgomery, and Huntsville, Alabama is predominantly rural. About four million people live in Alabama.

Background

Only about half of the nation's used oil was recovered and reused in 1977. The other half was usually discarded, often to the detriment of the environment.

In 1977, as part of a nationwide effort to conserve energy, Project ROSE was created. ROSE is an acronym for "Recycled Oil Saves Energy". Alabama recognized that its citizens could salvage millions of gallons of used crankcase oil each year. This oil would not be haphazardly dumped. Furthermore, new developments had made refining, processing, and reclaiming used oil a feasible and attractive idea.

Annually, the state generates more than 17 million gallons of used automotive oil and 7 million gallons of used industrial oil. Most of the industrial oil is routinely recovered; however, in establishing Project ROSE, recovering used motor oil presented a great challenge: Individuals who changed their own motor oil needed to be made aware of the hazards of dumping it, and garages needed reliable collection services. Project ROSE was designed to promote the collection of used oil from individual, corporate, and municipal consumers, garages, and service stations for treatment by a used oil processor.

Program Description

Project ROSE is a non-profit conservation program initiated by Alabama's Science, Technology and Energy Division, Department of Economic and Community Affairs, and sponsored by the University of Alabama. The program's goal is to protect the environment and conserve a valuable resource. To accomplish its goal, Project ROSE officials assist do-it-yourself used oil changers in recycling used oil and provide collection and recycling information to used oil generators, collectors, and recyclers.

To start Project ROSE, pilot projects were conducted in Tuscaloosa and Mobile. These cities were selected because of their large volumes of available used oil, the number of volunteer collection centers, and the availability of collectors and recycling facilities. The chance of success appeared promising.

The development of these projects required the workers to do the following:

Conduct Surveys. Surveys were conducted to provide basic data from individuals about whether they would recycle: from service stations about amounts, storage capacities, and collection services; and from waste oil handlers about volumes, incentives, fees, and processors' availability and capacity. The results of surveys showed a shortage of collectors and collection centers. The surveys pointed the way for a local government-sponsored program in Tuscaloosa. And, since Mobile had larger volumes of used oil and a number of used oil collectors, sponsorship by the private sector was proposed.

Identify Sponsors. City, county, civic groups, private industry, and joint sponsorship were explored as project sponsors. In Tuscaloosa, curbside pickup was selected. One thousand gallons of used oil per month were collected this way from Tuscaloosa.

Publicize the Program. Newspaper, radio, and television ads were used and pamphlets were distributed to promote the projects. Pamphlets were particularly useful to promote curbside pickup.

Evaluate the Results. In Tuscaloosa, a gain from 1,000 to 1,200 gallons of used oil a month was documented during the oil collection drive. In addition, more businesses requested drums for collecting used oil. Mobile's pilot project resulted in an estimated 750,000 gallons of used oil being reclaimed, an increase from 300,000 the previous year.

Expand the Program. Project ROSE expanded its collection programs for used oil to 12 additional areas. Sponsors ranged from the League of Women Voters and Alabama Conservancy to city sanitation department and private businesses.

WHAT MAKES ALABAMA'S PROGRAM UNIQUE?

From two pilot used oil projects, Alabama's Project ROSE has grown to national prominence. Currently, three types of used oil programs comprise Project ROSE: curbside collection, collection centers, and drum placement.

The curbside collection program is primarily used and best suited for metropolitan area in which consistent garbage collection is provided. Based on survey data, 70% of all respondents replied that they would save their used oil for recycling if it were picked up at their homes. The Cities of Birmingham and Tuscaloosa operate a curbside collection program for city residents served by curbside garbage collection. City garbage trucks equipped with metal storage racks costing $60 each, have been adapted to transport used oil deposited along the curbside.

Used oil is stored during route collection and transferred to a holding tank at city facilities. A collector picks up this used oil and pays the cities at a price determined by current market value.

A mass media campaign directed toward the cities' residents

was found to be essential to the implementation of a curbside collection program. The media program helps to make residents aware of the service being provided to them by each city. The campaign also explains the hazards of improper disposal and outlines the procedures used and type of storage container needed for participation in the program. Media promotion has been maintained to ensure success and maximize program benefits.

The Project ROSE collection center program consists of service stations, garages, and automotive service centers which voluntarily accept do-it-yourselfers' used oil for recycling. These businesses routinely collect used oil and practice profit from its sale. Once contacted by Project ROSE, most service stations and garages accept used oil. The news media is informed about a service station's or garage's participation as a Project ROSE collection center.

Service stations that participate receive information about used oil collection and about recycling businesses operating as the Project ROSE, used oil waste exchange. This information and other resources are available from Project ROSE. Future plans for Project ROSE include a statewide effort to contact all service stations, garages, time saving oil change shops, and automotive centers to inform them of the waste exchange service the program provides.

The third type of collection program is the drum placement program, in which 55-gallon drums are provided for do-it-yourself used oil collection. This program operates in rural area where there are few service stations or garages. Drums are located on the premises of cooperating businesses and small government agencies.

Information about collection center locations is provided to people who call Project ROSE on one of two toll-free, in-state hotlines.

Community awareness and statewide recognition of Project ROSE are essential to a successful recycling program. Media (radio, television, newspapers) are used extensively to disseminate program information and publicize the toll-free hotline numbers available for residents seeking local collection center information. Materials describing Project ROSE and detailing the environmental preservation and energy conservation benefits of recycling are provided free upon request. Project ROSE also provides informational materials to businesses, civic groups, environmental organizations, trade associations, and state agencies to be included with business correspondence. A quarterly newsletter is distributed in Alabama and nationwide to used oil industry members, state recycling agencies, and other persons and organizations which support the program.

In addition, an audiovisual presentation is available for statewide distribution. Designed for civic groups, environmental organizations, trade and business associations, schools, conferences, and workshops, this program provides essential program information and encourages do-it-yourself recycling. The presentation also assists communities in organizing collection programs where none currently exist.

OBSTACLES OVERCOME

The chief obstacle overcome by Alabama's Project ROSE was getting do-it-yourself oil changers to recycle. ROSE provides information to do-it-yourselfers regarding environmentally safe used oil disposal and recycling methods. Moreover, the ROSE program makes sure there is an available oil collection system for Alabamians' used oil.

While it is not possible to determine the amount of used crankcase oil collected from do-it-yourselfers, Alabamians recycled 8.2 million gallons of used oil in 1989. Project ROSE operates with city curbside collection and 200 collection centers. And it covers 45 of Alabama's 67 counties. This used oil recycling network works!

Joyce Hlava
Curbside Waste Oil Programs in San Jose and San Mateo

Browning-Ferris Industries was the first private company to initiate curbside used oil collection.

The original system in San Jose consisted of a 25-gallon tank mounted on a regular garbage collection truck. While some features of this program are still appropriate, many of them have been changed or up-graded in the San Mateo program.

Important issues are:

- BFI has experimented with both 25 and 15-gallon tanks. The 25-gallon tank is the optimal size.
- In order to reduce the time required on the collection route, the tank opening needs a funnel-shaped apparatus to hold the oil container upside-down while the truck is moving.
- Do-it-yourselfers waste oil often contains papers, leaves, or other small contaminants. A screen is necessary either at the truck tank opening or at the storage tank opening to screen our this debris.
- The more modern storage tank in San Mateo is above ground and has a suction system for emptying the truck tank without any leakage or spillage.
- BFI asks residents to put out oil in one gallon containers, preferably HDPE milk jugs. These are translucent and allow for easy identification of contaminants or separation which indicates liquid other than oil is in the jug. BFI makes clean jugs collected at the San Mateo recycling program available to residents who want to participate in the waste oil program.

CARL GERSTER __ INDUSTRY USED OIL PROGRAMS

Thank you Bob for inviting me to participate in your conference.

I am here today representing both Mobil Oil Corporation, where I am the manager of the Technical Department for the U.S., and the American Petroleum Institute, where my boss is the chairman of the API used oil working group. Today, I will be more definitive about Mobil's used oil activity since we have used oil collection programs up and running now in Florida and the Washington, D.C. metropolitan area. Mobil plans to expand the program nationally in 1991.

API's effort is not yet final, but I can at least give you a good idea of the working group's objectives for used oil management.

We are all, I think familiar with the magnitude of the used oil problem. It's shown here in red. A draft EPA report provides some idea of the extent. While there is significant dumping and disposal in the "non DIY'er automotive category," the bulk of the uncontrolled disposal problem is the DIY'er. Industrial and non-DIY generators are for the most part responsibly handling their used oil.

The used oil problem has not gone unnoticed over the years. You have been diligently collecting used oil as part of household collection programs for 10 years. A number of states have had used oil collection programs. There is a mature used oil reprocessing industry collecting used oil for recycling as fuel and some rerefining. EPA has long wrestled with the question of management standards and possibly designating used oil as a hazardous waste; and, the petroleum industry has not been silent. We and other companies have, for many years, advised consumers to conserve used oil by returning it to collection centers, and have prepared model programs including the oil drop logo for state government use.

But I think we all recognize that we have only just begun to address the problem. We definitely need to build on the lessons learned by you and others in the used oil collection effort to reduce the quantities of used oil now being dumped and disposed of improperly. The petroleum industry should be and wants to be a part of that effort. Our industry, through API, is currently determining how to participate in solving the problem. Based on what we know, we have concluded the following:

First, to reduce the environmental harm associated with improper used oil disposal, designating used oil as a hazardous waste is the wrong thing to do. Handling costs alone would climb from cents per gallon to dollars per gallon and, if one figures in the potential liability from mishandling a hazardous waste, there is no doubt in our minds that the current collection effort will diminish. If used oil is designated a hazardous waste, and the cost of proper disposal escalates, the DIY'er will continue to dump it and more of it will go on the ground, in sewers, and in municipal landfills.

Second, consumers of motor oil must be educated about the environmental harm caused by improper used oil disposal. Public awareness of the consumer's impact on the environment by household items such as paint, beverage containers, and chloroflurocarbon, has grown tremendously over the past decade. Diy'ers must be made aware of the detrimental impact of improper used oil disposal on land, surface waters, and ground waters. Education -- together with laws prohibiting improper disposal of used oil by DIY'ers -- is important to a successful used oil management program.

Third, we should make it easy for the consumer to do the right thing. We probably can never bring about a price for used oil such that it will be worth the driver's while on a purely monetary basis to bring used oil into a collection center.

But we can educate the consumer about the harm caused by improper disposal and how he or she can properly dispose of it. And then we can make that act of disposal convenient for the consumer.

Fourth, we think the permanence and stability that a successful used oil effort requires will have to come primarily from state and municipal government programs. Our recommendation on how best to finance such programs is still under API review, but a fee on motor oil with proceeds earmarked for education and convenient collection is one option that we are seriously considering.

Fifth, industry can and should augment state and municipal government programs with its own education and collection programs. Some companies, including my own, have already begun. Within API, we are determining whether a coordinated industry effort would be effective in bringing additional industry resources to bear on the problem.

As I said earlier, we, as an industry, are still reviewing and refining these proposals but they give you an idea of where we are going. From what I've heard this morning, it appears that there is general support for most of our positions.

Now, let me briefly explain Mobil's used oil program. We have designed an aggressive, proactive program to promote the proper disposal of used motor oil. As I said earlier it is important that the general public understand the need to properly dispose of used motor oil. Therefore, our program has two components, education and collection.

Mobil's program was initiated in October by putting a 7 second tag on Mobil television advertisements; the ad encourages the proper disposal of used oil.

In addition, educational brochures which discuss the proper handling of used oil are being distributed by all Mobil service stations, even those that cannot accept used oil, for example gas and snack shops.

On October 29, Bob McCool, Vice President of Mobil U.S. Marketing announced the roll out of the service station used oil collection program in Florida and the Washington, D.C. metropolitan area. We believe that Mobil can offer a valuable resource for the collection of DIY oil.

In the pilot areas, all Mobil owned service stations as well as many leased stations with conventional oil changing bays are accepting used oil from the DIY'er. This program is designed as a test program and will be modified as necessary before national roll out in 1991.

We do have press kets available please let me have your business cards and I'll get one to you.

In conclusion, used oil is an environmental problem we can all do something about. The petroleum industry will help. I don't think we can be <u>the</u> solution, but we can, I think, build on your past efforts -- and ours -- and be part of the solution.

LP4450P/2

Reducing Toxicity in Household Hazardous Waste

Shirli M. Axelrod
HHW Project Coordinator
Seattle Solid Waste Utility

Source reduction and toxicity reduction in household hazardous waste (HHW) is especially compelling. Unlike most other types of waste, HHW consists of the same substances in the same containers as new products of the shelf. HHW is not by-products, or "grounds" or "peelings" from a used product; HHW is mostly the original product left over.

Thus, the standard source reduction principles are all the more relevant: buy only what you need, use it up, give it away, etc. And the standard waste reduction strategies apply: can you buy small quantities? can you avoid problem packaging?

In the Seattle-King County Plan for managing HHW, we projected significant potential to reduce this type of waste in volume and toxicity. We projected impressive savings from doing so: the cost per ton for collection and disposal was calculated to be $14.00. The cost per ton for waste reduction was placed at $350.

Going beyond standard source reduction is even more important for HHW because of its toxicity. So, can the product be made less toxic? Are there substitute products or alternative processes? Other speakers discuss the growing body of information on how to avoid household toxics.

I would like to focus on what distinguishes a City government like Seattle from the other players helping to reduce HHW toxicity, and what roles we can take most effectively. This effort helps in determining what actions get us the greatest reduction for the money.

In our role as a garbage utility, we can regulate and we can educate. Seattle residents must use our service. This means we have access to all the households and can impose certain conditions on their service. Through our rates, we can illustrate that reduction is cheaper than disposal. We also have an avenue to educate to make use of the data on toxicity problems - such as arsenic levels found in laundry detergent powders - and on alternative products or practices.

We can also support the product research done by groups like the Washington Toxics Coalition, and distribute the information through our community outreach programs, at our HHW collection site, and in our mailings.

In our role as a customer, our utility and all the City agencies can exert pressure on markets. We can run demonstration projects to prove efficacy of less-toxic products or practices. We can favor less-toxic products, or products from safer processes.

Our powers to regulate manufacturing, packaging and advertising may be quite limited at the local level. This may vary considerably from state to state, however, local authority to tax or ban, to create incentives and disincentives should also be considered as tools to achieve toxicity reduction.

Most of our agencies bear responsibility for some of the damage and costs from improper disposal of HHW. How we chose to dispose of HHW we collect also affects toxicity reduction.

For many HHW types, disposal means reuse and recycling: paints, oils, solvents, anti-freeze. We also have acids and bases so they are non-toxic when disposed of.

The most toxic items we are left with are the poisons, mainly pesticides. These are incinerated or specially landfilled. They are usually the most costly. Landfilling is least cost-effective because their toxicity remains; incineration has its drawbacks also.

The high toxicity and widespread use of pesticides makes them a priority target for toxicity and source reduction efforts. Other priority items include those for which substitutes are easily available or which can easily be avoided such as laundry detergent powders, and various other cleaning products.

The keys for agencies like ours are:

- to make use of the information available to us in our public education efforts and our program choices;
- to stimulate the research to generate the information, when we can;
- to be a picky and a model "consumer" in our own right.

Opportunities for Household Hazardous Waste Reduction by Product Substitution

Philip Dickey, *Washington Toxics Coalition**

Introduction

Source reduction of household hazardous waste (HHW) is the most desirable way to avoid the adverse health and environmental impacts of certain household chemicals. This paper and the one following will discuss areas where the greatest opportunities exist for source reduction. I interpret the term "opportunities" broadly. I consider that opportunities for reduction exist when safer alternatives are available for products which are extremely hazardous, which are used and disposed of in large quantities, or which have particularly severe environmental impacts during use or disposal. This paper considers products which have direct environmental impacts and those which affect wastewater during use or disposal. The paper which follows will address hazardous products whose impact is largely on the solid waste stream.

Pesticides

Hazards

Household pesticides are in widespread use. It has been estimated that between 70 and 90 percent of all private households use some form of pesticides for home and yard uses. (von Rumker et al., 1972; Savage et al., 1980; Fear, 1983; Dewell, 1987; Lewis, 1988). Estimates of annual private household pesticide use in the Puget Sound Basin exceed 200,000 pounds of active ingredients (Tetra Tech, 1988). Household users are not trained in the use of pesticides and should therefore be considered "amateur" applicators. They probably apply pesticides at rates far in excess of typical agricultural uses (von Rumker et al., 1972; Gianessi et al., 1985).

Pesticides are of concern because of their toxicity to humans and their environmental impacts. Many pesticides exhibit high acute toxicity to humans and other mammals. In addition, pesticide formulations contain a large percentage of so-called "inert" ingredients, 65 of which have been identified by EPA as being of toxicological concern (US EPA 1985). Another 1054 inert ingredients are considered "inerts of unknown toxicity" (US EPA 1984). The long-term health impacts of pesticides remain unknown because large data gaps still exist in chronic health tests on full formulations including inert ingredients (O'Brien 1986). Some epidemiological studies have found correlations between pesticide use and serious health effects such as cancer (Hoar et al. 1986, Buckley et al. 1989). Yet many consumers are under the mistaken impression that EPA registration of a pesticide somehow indicates that it is safe. Perhaps because of this misapprehension and perhaps because label warnings are often printed in vanishingly small type, surveys show that consumers often do not follow directions for mixing and application, protective equipment, and environmental precautions (Dewell 1987).

Only a small fraction of pesticides actually reach the target pest. Spray drift and runoff can contaminate surface water and kill fish, which may exhibit toxic effects at parts per trillion levels. Diazinon, a commonly used lawn insecticide, has been responsible for major bird kills on golf courses. Carbaryl, another widely used insecticide, is highly toxic to honey bees. Although pesticide residues can remain in the soil and in plant tissue for many weeks, homeowners are often told by lawn care services that the chemicals are harmless as soon as they are dry.

Pesticides make up a significant portion of the products collected at HHW collection events. In King County's 1989 household hazardous waste roundup, pesticides composed about 10% of the

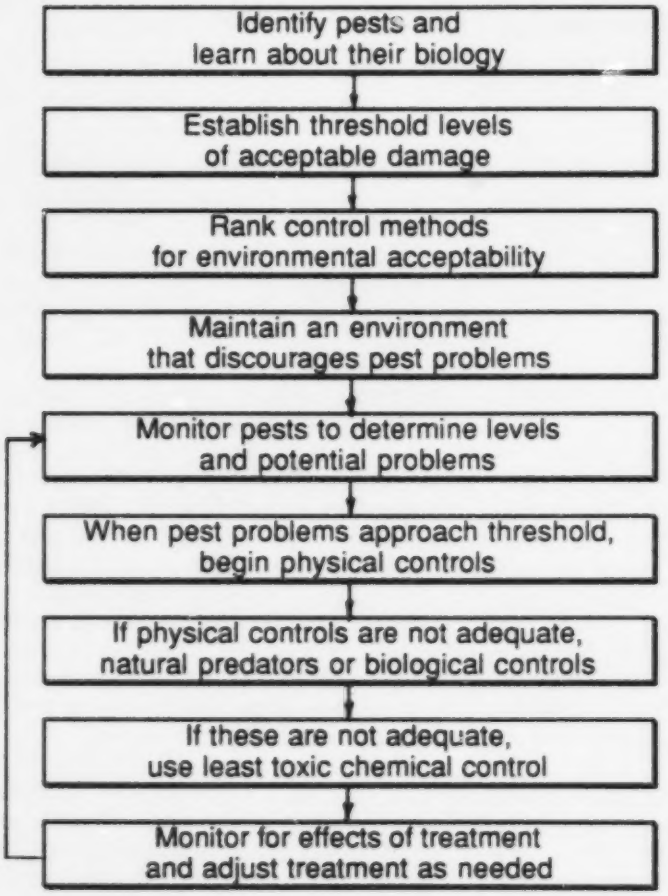
* *The Washington Toxics Coalition (4516 University Way NE, Seattle, WA 98105, (206) 6321545) is a non-profit environmental organization which works in the areas of pesticide reform and hazardous waste reduction, including household hazardous waste.*

total volume of hazardous substances brought in (Dewell, 1989). Even when collected at such events, the ultimate disposal of these pesticides may not be environmentally sound. Any many people still don't know about collections or do not have access to them. A survey in Missoula, MT found that 50% of respondents disposed of pesticides in the trash, while another 50% claimed not to dispose of them at all (Dewell 1987). Only 1/3 of people who disposed of pesticides in the trash took any special precautions such as wrapping the product containers in paper or plastic.

Alternatives

Chemical pesticides present an important opportunity for toxics reduction because of their widespread use, their hazardous nature, and the existence of effective alternatives in many cases. The complexity of pest biology and the fact that even "safer" pesticides still can have serious health and environmental effects argue against a simple product substitution or "environmentally friendly" labeling approach. A better goal would be to teach integrated pest management (IPM), so that chemical controls would be recognized by more people as a last resort rather than as a first choice.

The IPM Decisionmaking Process


Identify pests and learn about their biology
Establish threshold levels of acceptable damage
Rank control methods for environmental acceptability
Maintain an environment that discourages pest problems
Monitor pests to determine levels and potential problems
When pest problems approach threshold, begin physical controls
If physical controls are not adequate, natural predators or biological controls
If these are not adequate, use least toxic chemical control
Monitor for effects of treatment and adjust treatment as needed

Integrated pest management programs around the country have succeeded in reducing agricultural pesticide applications by up to 83% (Martin 1989). An IPM program in the National Parks reduced pesticide use by 70% in the first three years (Olkowski et al. 1988). Some of the

most frequently encountered urban pest problems are particularly amenable to non-chemical controls. The alternative controls listed in Table 1 are examples of those which would be ranked and listed as options in a IPM program.

Table 1. Alternative Controls for Common Household Pests

Pest	Some alternative controls
aphids	traps, predators, soaps, plant selection & culture
carpenter ants/termites	moisture control, barriers, boric acid, pyrethrum
caterpillars	pruning out, B.t.
clothing moths	prevention, airing & fluffing, vacuuming, freezing
fleas	vacuuming, dessicants, citrus oils, methoprene, soaps, pyrethrum
filth flies	sanitation, screens, flyswatters, traps,
roaches	sanitation, sealing entry, boric acid
slugs/snails	copper barriers, traps
wasps	traps, pyrethrins
weeds (annual & biennial)	mechanical removal; prevention through groundcovers, proper turf management.

This list is by no means exhaustive, but is included merely to show the variety of pests for which alternative controls exist that are safer than traditional pesticides. A rich variety of alternatives makes an IPM approach necessary. Otherwise the householder will be confused by the choices available and may revert to toxic chemicals if a particular alternative is not effective for reasons he/she does not understand.

It is probably asking too much to expect the typical individual to consciously follow a classical IPM decisionmaking process in dealing with a specific pest problem. However, the same goal could be achieved by incorporating the IPM process into existing community resources and then pursuading citizens to utilize these resources before purchasing chemicals. If, for example, cooperative extension agents across the country were to adopt the IPM approach, citizens could call their local agents to get a pest identification and to learn about appropriate physical and biological controls as well as chemical controls. Currently many extension publications still take a chemical-intensive stance. Bulletins written with an IPM viewpoint would be a valuable resource. This is beginning to change here in King County, where newer bulletins stress non-chemical methods.

Education of individual citizens must be increased so that they realize the dangers of using pesticides and are encouraged to reserve their use as a last resort. We need to encourage a new way of thinking which recognizes the interconnection between all aspects of the ecosystem, including beneficial insects and other predators. Such an approach would rule out using most chemicals for calendar or preventative applications. Citizens need to know where to turn for specific information on pest identification and biology, unacceptable damage levels, prevention, non-chemical treatment methods, least-toxic chemicals, and how to target the pest. The Washington Toxics Coalition has produced a series of publications which provide this type of information for common household

pest problems. These fact sheets are being distributed by a number of state and local governmental agencies in Washington.

Stores that sell pesticides could be encouraged to stock more traps, barriers, and other physical pest controls and to display information on how to use these products. Currently the "Ortho Problem Solver" and other chemical company publications make it too easy for customers to use pesticides as a first resort. These could be replaced with other references which take a more balanced approach. The word must also be gotten out to gardening writers and speakers, who often are quick to recommend pesticides for lawn and garden care.

One interesting way to educate homeowners is to establish an "IPM Neighborhood" in which participants sign a pledge to utilize IPM in their own homes. Interested citizens would have access to informational handouts and perhaps even workshops to provide the information needed to carry out this pledge. A designated individual in each block or other geographical area could be the resource person to whom participants could turn when they have problems. Participating homes would show a sticker or placard. Some participants might wish to go a step further and agree not to use pesticides at all in their IPM program. This neighborhood wide approach to IPM would provide more interchange of information and more positive feedback than an individual-based approach, in which neighbors don't know what each other is doing. Stores could assist in a program of this type by offering discounts on non-chemical pest control products such as traps, barriers, and soil amendments.

Wastewater Pollutants

Sources

Many types of household products which are in nearly universal use enter wastewater in their entirety. Examples include laundry detergents, bleaches, dishwashing detergents, scouring powders, toilet bowl cleaners, and other household cleaning products. Other types of products may partially end up in wastewater. These include paint thinners, paint strippers, degreasers, spot removers, and other solvents. In addition, an unknown number of people dispose of all types of hazardous products by pouring them down the drain.

A combination of these factors is responsible for some portion of the hazardous organic chemicals and toxic metals known to be found in domestic wastewater. Studies by the Municipality of Metropolitan Seattle (Metro), summarized in Table 2, concluded that residential sources contribute substantially to treatment plant loadings for both metals and organics (Galvin, 1988).

Table 2. Residential Contribution of Commonly Detected Metals and Organic Chemicals to Seattle Metro's Wastewater Treatment Plants (table from Galvin, 1988).

Compound	Calculated Residential Load			
	Renton Plant		West Point Plant	
	lb/day	%	lb/day	%
antimony	.17	37	1.3	22
arsenic	.62	36	1.2	30
cadmium	.71	26	1.3	17
chromium	.76	2.5	3.1	2.4
copper	25	36	50	26
lead	14	34	40	23
mercury	.13	53	.27	41
nickel	10	51	28	40
silver	.40	9	1.1	8
zinc	35	41	150	41
phenol	6.4	56	15	47
naphthalene	4.3	75	10	68
diethyl phthalate	3.6	83	8.1	83
di-n-butyl phthalate	14.8	69	33.8	64
butyl benzyl phthalate	13	68	30	59
methylene chloride	8	66	18.6	59
chloroform	1	45	2.3	44
trichloroethane	3.4	38	7.9	30
tetrachloroethylene	9.4	88	21.7	84
benzene	1.2	66	2.8	63
ethylbenzene	1.0	24	2.3	19
toluene	10	29	23	29

It is evident that household use may contribute a major portion of some types of toxicants, including arsenic, mercury, nickel, zinc, phenol, phthalates, methylene chloride, and tetrachloroethylene. Relative contributions from households may be expected to increase as industrial sources come under stricter regulation.

Hazardous chemicals present problems both for on-site septic systems and for municipal sewage treatment. Many organic solvents can pass through septic tanks and may pose a threat to groundwater (Galvin 1988). Metals tend to bind more readily onto septage and soil particles, but they may still pose water contamination problems in septic septic systems (Cantor et al. 1985; Kolega et al. 1982). While some chemicals are removed from wastewater in municipal treatment plants, in many cases the "treatment" is just aeration or settling. Thus volatile organic solvents evaporate and become air pollutants while metals and phthalates are transferred to the sludge, which is used as fertilizer in some locations. In fact, the higher the percent removal of metals during treatment, the more of these metals are deposited in the sludge. Waste treatment utilities need to reduce sludge metals to the lowest possible levels, and one way to achieve this reduction is to eliminate household sources as well as industrial ones.

Alternatives

We do not yet fully understand which household products are responsible for the presence in domestic wastewater of all of the pollutants listed above. The source is apparent when the pollutant is a major ingredient in a product likely to be poured into the drain. Thus paint removers containing methylene chloride and toluene certainly contribute those chemicals to wastewater. Similarly, phenols in disinfectants, medicines, and a host of other products are bound to account for their major showing in domestic wastewater. In some of these cases, significant opportunities exist to reduce wastewater contamination by encouraging a shift to products that do not contain such toxic or persistent ingredients. These alternatives can be either commercial products or recipes. Table 3 gives some examples of alternatives to products which are thought to be major contributors of organic chemical pollutants in domestic wastewater. In most cases there are commercially available products which do not contain the pollutants listed below. Consumers should be encouraged to avoid products which contain these ingredients.

Table 3. Alternatives to Products with Organic Water Pollutants

Product	Pollutant	Alternatives
disinfectant	phenols	pine oil, quats, hydrogen peroxide
bowl deodorizers	naphthalene, p-dichlorobenzene	frequent cleaning with non-chlorinated scouring powder
paint stripper	methylene chloride, toluene	water-based paint stripper, don't clean brushes over sink
metal cleaners	petroleum distillates	citric acid based cleaners
furniture polish	petroleum distillates	citrus oil solvents
spot removers	trichloroethane, naphtha	detergent-based spot removers and presoaks
degreasers	trichloroethane, trichloroethylene, tetrachloroethylene	citrus solvents, biodegradable surfactants
oil-based paint	petroleum distillates	latex paint
used antifreeze	ethylene glycol, metals	recycle it

Table 4. Measured Concentrations of Metals in Laundry Products
(units are parts per million, ppm)

Product	Cr	Zn	Hg	As	Cd	Cu	Pb	Ni	Ag
Ajax	0.6±.06	4.2±.1	0.04±.01	<0.1±.4	0.03±.02	0.67±.3	0.19±.08	0.38±.1	1.100±.02
All	0.55±.06	1.0±.1	<0.01±.01	<0.4±.4	<0.02±.02	0.32±.3	0.73±.08	0.16±.1	0.080±.02
Arm and Hammer	0.36±.06	1.1±.1	<0.01±.01	0.80±.4	0.08±.02	0.30±.3	0.08±.08	0.15±.1	0.045±.02
Bold	0.63±.06	4.1±.4	<0.01±.01	21.60±2	0.18±.02	0.48±.3	0.77±.08	0.38±.1	0.029±.02
Borax	0.40±.04	1.0±.1	0.01±.01	22.10±2	0.02±.02	<0.18±.3	<0.09±.08	0.18±.1	0.173±.02
Cheer	0.65±.06	3.0±.3	<0.01±.01	15.70±1.5	0.25±.02	0.29±.3	0.10±.08	0.20±.1	0.049±.02
Clorox	0.63±.06	2.6±.3	<0.01±.01	3.90±.4	<0.02±.02	0.23±.3	0.16±.08	0.31±.1	<0.02±.02
Cold Power	0.36±.06	3.4±.3	<0.01±.01	<0.4±.4	0.02±.02	0.36±.3	<0.09±.09	0.18±.1	0.068±.02
Country Safe	0.29±.06	1.1±.1	0.01±.01	<0.4±.4	0.03±.02	0.48±.3	<0.08±.08	0.16±.1	0.136±.02
Dash	0.59±.06	4.8±.5	<0.01±.01	9.60±1	0.38±.04	0.27±.3	<0.09±.09	0.40±.1	0.102±.02
Dreft	0.55±.06	3.6±.4	<0.01±.01	15.60±1.5	0.14±.02	0.30±.3	0.10±.08	0.80±.1	0.040±.02
Ecover	0.91±.09	4.3±.4	<0.01±.01	<0.44±.4	0.02±.02	0.27±.3	0.49±.05	3.70±.4	0.227±.02
Fresh Start	1.12±.1	1.0±.1	<0.01±.01	5.31±.5	0.33±.03	<0.17±.3	<0.41±.04	1.00±.1	0.149±.02
Oxydol w/Bleach	0.84±.08	8.3±.8	<0.01±.01	16.60±1.7	0.19±.02	0.38±.3	0.10±.08	0.29±.1	0.048±.02
Purex	0.53±.06	2.0±.2	<0.01±.01	0.24±.4	<0.02±.02	0.40±.3	<0.08±.08	0.24±.1	<0.02±.02
Shaklee Basic L	0.40±.06	10.2±1	<0.01±.01	0.26±.4	<0.02±.02	1.02±.3	0.17±.08	0.17±.1	0.034±.02
Tide	0.65±.06	4.4±.4	<0.01±.01	17.40±2	0.40±.04	0.61±.3	0.09±.08	1.39±.1	0.078±.02
Tide Unscented	0.72±.07	4.0±.4	0.01±.01	17.50±2	0.14±.02	0.45±.3	<0.09±.08	0.63±.1	0.045±.02
White King D	0.71±.07	2.5±.3	0.01±.01	<0.09±.4	0.02±.02	0.64±.3	0.18±.08	0.36±.1	<0.03±.03
Arm and Hammer liq	0.99±.1	1.2±.1	<0.01±.01	<0.05±.05	<0.002±.002	0.11±.03	0.11±.01	0.06±.01	0.007±.002
Cheer Free liq	0.56±.06	1.5±.1	0.01±.01	<0.09±.05	<0.02±.02	0.28±.03	0.10±.01	0.29±.03	<0.03±.03
Cheer Liquid	0.09±.01	0.1±.1	0.01±.01	0.06±.05	<0.002±.002	0.03±.03	0.01±.01	0.05±.02	0.020±.002
Ecover Liquid	0.52±.05	1.9±.2	<0.01±.01	<0.10±.1	<0.03±.03	<0.19±.03	0.15±.02	0.24±.01	0.219±.02
Granny's Power Plus	0.44±.04	0.6±.06	<0.01±.01	<0.09±.05	<0.02±.02	<0.2±.2	0.10±.01	0.19±.02	0.173±.02
Life Tree	0.44±.04	1.0±.1	<0.01±.01	<0.09±.05	<0.02±.02	<0.2±.2	0.39±.04	0.10±.01	<0.03±.03
Purex liq	0.45±.04	0.7±.1	<0.01±.01	<0.09±.05	<0.02±.02	<0.2±.2	0.19±.02	0.09±.01	<0.03±.03
Shaklee Liquid	0.49±.05	1.1±.1	<0.01±.01	0.09±.05	<0.02±.02	<0.2±.2	0.18±.02	0.27±.03	<0.03±.03
Tide liq	0.61±.06	2.0±.2	<0.01±.01	<0.29±.05	<0.02±.02	<0.2±.2	0.10±.01	0.29±.03	<0.03±.03
Wisk	0.46±.05	0.4±.1	<0.01±.01	<0.09±.05	0.02±.02	<0.02±.02	0.20±.02	0.10±.01	<0.03±.03
Ivory Snow	0.63±.06	1.0±.1	<0.01±.01	1.32±.05	<0.02±.02	<0.2±.2	0.19±.02	3.77±.4	<0.03±.03
White King	0.54±.06	1.4±.1	<0.01±.01	0.29±.05	<0.02±.02	0.29±.03	0.19±.02	0.19±.02	<0.03±.03

Eliminating toxic metals from domestic wastewater presents a real challenge because typically these metals are contaminants rather than ingredients in consumer products. Thus the consumer has no way of knowing that the products he or she uses even contain toxic metals. If the levels of metal contamination can be linked to particular types of products, it may be possible and worthwhile to educate consumers about this issue. Recently the Washington Toxics Coalition has been studying metals in cleaning products, and our results lead us to believe that some significant metal reduction is possible through consumer education and perhaps manufacturer reformulation or alternative sources of raw materials (Dickey, 1990a).

The first group of products we looked at was laundry detergents. Earlier work by Gurnham (Gurnham, 1979) had found extremely high levels of metals, particularly nickel and zinc, in a variety of cleaning products. By far the highest levels were found in powdered laundry detergents, approaching 1000 parts per million (ppm). We chose to analyze a wide variety of brands and types of detergents to see if there were any clear trends.

Our results are presented in Table 4. All concentrations are expressed as ppm by weight in the original sample. It is clear that the metal levels vary widely from one product to another and that levels are much lower than those reported by Gurnham. However, one fact stands out: liquids have much less metal contamination than powdered detergents. To see this fact more clearly, consider the average levels shown in Table 5. The contrast is most striking in the case of arsenic, which was the metal found in the highest concentration. Liquids had almost 500 times less arsenic that powders. Non-phosphate products (which include liquids as a subset, but also include some powders and soaps) had 75 times lower arsenic levels than phosphate products.

Table 5. Average Metal Concentrations in Laundry Detergents (in ppm)

Type of Product	Cr	Zn	Hg	As	Cd	Cu	Pb	Ni	Ag
Overall average	.71	3.18	0.00	5.94	0.09	0.33	0.20	0.67	0.11
Powders only	0.77	4.44	0.01	9.78	0.15	0.50	0.22	0.74	0.16
Liquids only	0.63	1.31	0.00	0.02	0.00	0.05	0.19	0.21	0.05
Soaps only	0.59	1.20	0.00	0.81	0.00	0.15	0.19	1.98	0.00
Phosphates	0.66	4.59	0.00	16.29	0.24	0.40	0.18	0.58	0.06
Non-phosphates	0.42	3.14	0.00	0.22	0.02	0.48	0.16	0.18	0.06

Recently the Soap and Detergent Association commissioned its own study of metal contamination in laundry products (Jenkins et al. 1990). That study did not test metal levels of individual brands but reported measurements on a composite mixtures in which each particular brand was represented according to its share of the market. Tests on this composite detergent, when multiplied by appropriate usage factors, should reproduce typical metal inputs to a waste treatment system. Composite mixtures were made for both powdered and liquid detergents, as well as bleaches and fabric softeners. Table 6 compares our results to those reported in the SDA study.

Table 6. Comparison of Average Metal Levels (units are ppm)

Product Category	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Zn
SDA composite pwdr	13.8	0.26	1	0.49	0.2	0.025	0.5	0.5	7.27
WTC average pwdr	9.78	0.15	0.77	0.50	0.22	<0.01	0.74	0.16	4.44
WTC weighted pwdr	10.5	0.21	0.61	0.38	0.18	<0.01	0.67	0.06	2.93
SDA composite liq	0.023	0.2	1	0.21	0.2	0.025	0.5	0.5	1.16
WTC average liq	0.02	0.00	0.63	0.05	0.21	0.00	0.21	0.05	1.31

The rows labeled WTC average represent the unweighted averages of the results from the powders and the liquids that we tested. To get an idea of the effect of weighting by market share, we also present results for the powders with the metal concentrations weighted by the market shares reported by SDA. There were several detergents included in the SDA study which we did not test, and our results can be expected to be lower by that amount. It is clear that our results are in quite close agreement, within a factor of 2 in most cases, particularly those where contamination exceeds 0.5 ppm. In particular, note that the SDA study found 600 times more arsenic in the composite powder than in the composite liquid. We found 500 times more arsenic in the average powder than in the average liquid.

Of the metals tested, arsenic is the only case where the contamination is great enough to have any significant impact on the metal content of waste sludge. Based upon manufacturers' suggested usage for one load per week, averaging over all of the detergents we tested we find an arsenic loading of 55 micrograms/capita/day. For a population of 1 million, this loading amounts to 120 lbs per year, or approximately 20% of the total arsenic from domestic sources in King County wastewater. How would this total be affected by major changes in consumer detergent use? The answer is shown in Table 7.

Table 7. Effect of Consumer Laundry Practices on Arsenic Loading to Waste Treatment Plants (based on King County, WA)

Scenario	Arsenic (lb/yr)	% of Total Arsenic	Change in Total
Status quo	62	10%	0
All use phosphate	182	33%	20% increase
All use liquids	0	0	10% decrease
All use phosphate-free	2	0	10% decrease
All use soaps	75	1%	9% decease

There is an opportunity here for us in the environmental field to work with manufacturers to improve their products. There may be ways to reduce the arsenic content of these detergents through alternative sources of phosphate or by reformulating the products. By exchanging information and viewpoints we can learn more about the environmental effects of household chemicals and work toward minimizing them.

We also feel that it is worthwhile to let consumers have access to information on product ingredients and contaminants so that they can purchase those products with the least environmental impact. Certainly it is appropriate for a non-profit organization such as the Washington Toxics Coalition to place this sort of information in front of the public. We have been doing so through articles in our newsletter (Dickey, 1990b) as well as other publications (Dickey, 1990c). It may very well also be appropriate for a public agency to make this information available to its customers as a way to reduce metal influent in wastewater. If a public agency does not wish to identify brands by name, it can certainly urge customers to choose liquid detergents or phosphate free detergents and achieve the same result.

The Toxics Coalition is extending its metals testing to dishwashing detergents, toilet bowl cleaners, scouring powders, and other household cleaners. Tests at Metro found up to 220 ppm chromium in some toilet bowl cleaners (Hilderbrand 1989). Results from the SDA study indicate that arsenic levels in automatic dishwasher detergents exceed even those in powdered laundry detergents. This is not surprising since all major brands of automatic dishwasher detergents contain phosphate. We are testing these detergents individually. Since several companies have recently introduced phosphate-free auto dishwasher detergents, it will be interesting to see if reductions in arsenic similar to those observed for laundry detergents would follow from a switch to these new products. Currently dishwasher detergents are exempt from phosphate bans in all states which have such bans. In those states, dishwasher detergents may represent the largest single source of

arsenic in domestic wastewater. As soon as effective alternatives are available, it would make sense to encourage consumers to switch to these products.

Summary and Conclusions

Real opportunities exist to reduce the use of hazardous household products. This paper has focused on pesticides, because of their toxicity and various environmental impacts, and on products whose use or disposal contribute organic pollutants or toxic metals to wastewater.

Household pesticide use could be significantly reduced if homeowners utilized an integrated pest management approach to pest problems such as lawn and garden insects and weeds, fleas, structural pests, roaches, and other insects. IPM strategies have been successful in many institutional programs as well as in household situations. The challenge is to modify a strongly ingrained belief that EPA registered pesticides are safe and there are suitable as a first resort. Since the IPM decisionmaking process can be somewhat complex, we must provide community resources which will provide accurate and convenient information on pest identification and non-chemical controls. A good model for citizens would be provided if more government agencies, school districts, churches, hospitals, and other institutions would adopt IPM policies for managing pests on their grounds. These policies could be the basis for a network of "IPM Neighborhoods" in which citizens agree to adhere to the IPM approach in their own homes.

Significant amounts of organic chemical pollutants and toxic metals have been found in domestic wastewater, presumably from the use and/or disposal of household products. These pollutants are often transferred to the air or to sludge in municipal waste treatment and some may pass through on-site septic systems, endangering groundwater. Pollutant levels could be reduced in many cases if consumers avoided products which contain these pollutants as ingredients or at least avoided rinsing them down the drain. Toxic metals often occur as contaminants in household products, and avoiding them is more difficult because of a lack of information. We have found significant amounts of arsenic in phosphate laundry detergents. If consumers switched to readily available liquid or other non-phosphate formulations (which may contain 500 times less arsenic on average), arsenic loadings would drop by 10-20%. We are continuing to look for other significant sources of metals in household products.

The Washington Toxics Coalition is working closely with local solid waste and wastewater utilities to identify safer alternative products and to educate the public about responsible use and disposal of household products.

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A NEW SOURCE REDUCTION PROJECT:

THE POTENTIAL FOR SAFE SUBSTITUTES

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Introduction

Pollution prevention has been targeted by the EPA as a priority research area. Pollution prevention is a multi-media approach to the reduction of negative impacts that products and processes have on the environment. A major focus area for pollution prevention research is "clean products," referring to products which are less damaging to human health and the environment at any or all stages of a product's lifecycle. Likewise, the aim of safe substitutes research is to identify ways to decrease the environmental releases and toxics associated with products and their manufacture.

Evaluating the Potential for Safe Substitutes

One of the clean product research projects being funded by the EPA's Pollution Prevention Research Branch involves evaluating the possibility of dramatic reductions in hazardous waste and toxic chemical exposure associated with commercial products. By identifying priority products for substitution and evaluating the feasibility of safe substitutes for those products, this project can be an important shift toward preventing toxic chemical pollution at the source.

The objectives for this three-year project are as follows:

1. Evaluate the potential for safe substitutes for toxic and polluting products.

   A. Identify priority products, including consumer products, industrial chemicals, and pesticides for safe substitute research.

   B. Identify and evaluate existing substitutes for priority products.

   C. Document case studies of successful clean product substitutes for priority products.

   D. Determine technical impediments to the use of safe substitutes.

2. Transfer information about safe substitutes through background documents.

3. Determine future research needs for safe substitutes for priority products.

Identification of Priority Products

The identification of priority products for substitution will start with the identification of priority chemicals. After specific chemicals are prioritized, then determinations can be made on where or in what products those chemicals are found. The approach to identifying priority chemicals will be to utilize existing information, such as the Toxics Release Inventory (TRI) data base. The toxicity information will be combined with information on production, use, exposure and environmental releases in a matrix to determine priority. The top 25 chemicals will be selected from the matrix for further study.

Identification and Evaluation of Existing Substitutes

Identification of existing, known substitutes will be conducted by reviewing the literature and interviewing vendors and users. Literature review and interviews will determine as much as possible about the efficacy of the substitutes, their impact on waste generation and chemical exposure, and their economic impact.

Documentation of Case Studies

For most of the priority products, at least one successful substitution will be presented in detail to illustrate how substitutions occur in practice. The information for this case study will be collected through interviews.

Determination of Technical Impediments

For each priority product, impediments to substitutions will be identified. These impediments include the lack of substitutes that perform the same function as effectively, economic considerations, raw materials constraints, and negative secondary impacts of substitutes. Impediments may also include institutional factors such as military or government product specifications.

Development of Background Document

The results of the research will be reported in a form that can serve as a background document on safe substitutes. This document is scheduled to be prepared 18 months after the project start. The document will identify where there is a question about the availability or efficacy of particular substitutes.

Status of the Project

The "Potential for Safe Substitutes" project was started in September 1990, so it is in its beginning phase. The work is being conducted by the University of Tennessee's Waste Management Institute out of the Energy, Environment and Resources Center.

This paper has been reviewed in accordance with the U.S. Environmental Protection Agency's peer and administrative review policies and approved for presentation and publication. Mention of trade names or commercial products does not constitute endorsement or recomendation for use.

Potential for Safe Substitutes

University of Tennessee
3 - Year Cooperative Agreement

Start Date — September 1990

Objectives

- Identify Priority Products
- Evaluate Existing Substitutes
- Document Case Studies
- Determine Technical Impediments
- Develop Background Documents
- Determine Research Needs

Clean Products Research Program

1. Clean Products Background Document
2. Life-Cycle Methodology
3. Product/Process Design Manual
4. Clean Product Case Studies
5. Potential for Safe Substitutes

THE HAZARD FREE COMMUNITY PROGRAM: WORK IN PROGRESS

Richard Conlin
Metrocenter YMCA - October 1990

I. ABSTRACT

Metrocenter YMCA is conducting a project with the City of Kirkland as the pilot for a program called the Hazard Free Community. The goal of the program is to organize community campaigns to reduce problems of hazardous materials by encouraging and assisting in waste reduction, recycling, and safe disposal of household hazardous wastes. The Hazard Free Community will promote the idea that people can make a difference in ensuring that their community and the environment around it are protected from contamination by hazardous materials. With this kind of a community mobilization effort, we hope to reach beyond the 5 or 10% of the population that has been involved in collection activities, and involve a significantly larger proportion of the population.

II. BACKGROUND

The Kirkland HFC project is a pilot, designed to demonstrate that the concept of a Hazard Free Community is a workable one. The project is currently about 75% complete, and has been very successful (see attached summary of program accomplishments to date). Most of the components included in the original package of programs have proved to be effective; some have required modification; and other new programs have been developed in the course of the project as new concepts and ideas for reaching different segments of the population have emerged out of the experience.

Funds for the Hazard Free Community project have come from the Puget Sound Water Quality Authority PIE (Public Information and Education) Fund program, the City of Kirkland, the Washington Department of Ecology through a Public Participation Grant, and other local agencies that produce materials and research about hazardous wastes.

The City of Kirkland is a community of generally high educational and socioeconomic level, and one which has had a record of environmental concern. Kirkland was selected deliberately because it was perceived to be a community which would be relatively easy to make such a project effective in, in order to make the initial pilot one which had a good chance of being effective.

III. GOALS AND OBJECTIVES

A. Goals

To develop a model program for minimizing the use and disposal of hazardous materials in a community, and to prepare a plan for doing this that can be widely replicated.

B. Objectives

1. Decrease individual dependence on hazardous materials and increase knowledge of alternatives to hazardous materials.

2. Broaden the participation in programs that educate the public about reduction, recycling, and safe disposal of hazardous materials.

3. Make resources that assist SQGs with hazardous materials accessible to a broad spectrum of businesses.

4. Work with a youth group that will perform action programs to address the use and disposal of, and alternatives to, hazardous materials.

5. Provide safe household hazardous waste collections for residents.

6. Coordinate resources and implement programs available from citizen and business organizations, and from local government agencies.

C. Quantitative Objectives

The following quantitative objectives are used as a means to measure program success:

1. Secure signatures on the Hazard Free Community pledges from approximately 25 percent of the households, 50 percent of target businesses, and major governmental agencies in the target community.

2. Recruit and train 50 community volunteers to organize and recruit the public for workshops, distribute information to their neighbors and local retailers, assist in the small business campaign, and participate in action projects.

3. Have an attendance of 250 people at Hazard Free workshops.

4. Implement a program to reach teachers and students at local schools with information about hazardous materials.

5. Involve 30 youth in action projects that target youth and family use of hazardous materials, and inform on waste reduction recycling, and alternatives to hazardous products.

6. Implement a campaign to post displays in at least ten retail stores, and to have at least one store become a model store to promote recycling and reduction of hazardous materials.

7. Implement a discount coupon for the purchase of alternatives to hazardous products by householders.

8. Develop and have published in the local paper a set of articles on alternatives to hazardous products in the home.

9. Involve residents in at least five events for stencilling storm drains.

10. Have at least 10 percent of residents attend a household hazardous waste collection.

IV. PROJECT ELEMENTS

In order to mobilize the community, many diverse groups, including householders, environmental organizations, the Fire Department, and business associations, have become involved in the process. A variety of education and action programs, promoted through stores, schools, agencies, businesses, and individuals, offer short- and long-term activities which allow people to take constructive steps toward protecting their environment. The initial set of programs that has been implemented is outlined below. However, it is anticipated that there will be additional programs developed as the campaign progresses. Further, even though most of these programs have been tested or will be tested in the Kirkland setting, some of them may prove to be ineffective in the second community, and will need to be revised.

The following tasks are part of the program:

School Programs

Project staff works with teachers to ensure that students learn about hazardous wastes and environmental issues in their classrooms. A poster contest will be held for primary school students.

Earth Corps Group

High school students are involved in Hazard Free activities through Earth Corps and other environmental clubs. Students address community hazardous waste education through their school clubs and a local water quality group.

Household Pledge

Signatures are being gathered for the Hazard Free Pledge, an outline of activities that householders can do to reduce contamination to the environment by hazardous household products(copy attached). The goal of the pledge is to reinforce proper actions and to motivate people to carry them out.

Hazard Free Workshops

Hazard Free workshops are being held at community centers and with community organizations, to educate participants about hazardous materials in the home, alternatives to hazardous products that are

safe and effective, and gardening practices that preserve the environment while addressing pest problems (an information sheet on the workshops is attached).

In future communities, a special effort will be made to reach out to low income and low literacy rate communities, through the production of information materials and the use of visually oriented products with sophisticated graphic design.

Retail Stores

The project is working with retail stores to provide educational material displays to help ensure that consumers become better informed about hazardous products and their proper use and disposal. Four grocers, Safeway, Larry's Markets, Puget Consumers Cooperative, and Fred Meyer, have agreed to sponsor and honor a discount coupon for the purchase of alternatives to hazardous products. One store will be asked to become a model store and comprehensively address the issues of solid and hazardous wastes in their operations.

Newspaper Articles

A set of six articles on alternatives to hazardous products in the home were carried as a weekly feature by the Journal-American, a daily newspaper that serves the target community.

HHW Collections

The King County Wastemobile is visiting Kirkland for a total of four weeks during 1990, in June and December. In addition, the City of Kirkland is sponsoring four collection days, in April, July, September, and November.

Water Quality Group

Residents are involved in a program to stencil storm drains, and Kirkland has agreed to provide support to establish a water quality group that will learn about the local watersheds and protect those watersheds from degradation and pollution from hazardous materials.

Small Business Programs

A Hazard Free Community Business Pledge has been distributed to 93 local businesses with the cooperation of the Kirkland Chamber of Commerce and the Kirkland Downtown Association(copy attached). The pledge outlines waste reduction and recycling principles that can help businesses reduce the amounts of hazardous materials that might otherwise be disposed of. Information materials are also being distributed to small businesses about how to properly manage their hazardous materials, and follow-up calls will be made to businesses in priority categories (automotive repair, dry cleaners, boat maintenance, photography and print establishments) to ensure that they are responding to the pledge and to offer additional

detailed information.

Government Pledge

The City of Kirkland will be asked to sign a pledge similar to those signed by householders and businesses committing them to proper care of hazardous materials and to using alternatives wherever possible. This pledge is currently under development.

V. BUDGET

Metrocenter's work on the Kirkland Hazard Free Community project has a total budget of $52,000. The project began in the late winter of 1990, and will conclude in March of 1991. The funds have been used to support approximately 1/2 time for two staff people working on the project, as well as for materials and other expenses.

In addition, the City of Kirkland has donated in-kind staff services and funded the HHW collection events; King County covers the cost of Wastemobile collections; and there have been numerous donations by local businesses as well as many volunteers.

VI. EVALUATION

The success of the Hazard Free Community project will be evaluated by recording the number of households and businesses that sign the Hazard Free Pledges; the number of people who take part in workshops, small business and store campaigns, school programs, Earth Corps, and water quality groups; the number of participants and quantity of wastes brought to the household hazardous waste collections; and the number of volunteers who assist with implementation of the above programs. We will also request written evaluations from 5 percent of households that signed the Hazard Free Pledge as a means of measuring the effectiveness of this program. The Municipality of Metropolitan Seattle Water Quality staff is carrying out an independent evaluation of the project, independent of Metrocenter's program activities.

Basically the Kirkland project seems to be working well. We anticipate meeting most of the quantitative goals, and the City seems very pleased with the program. Our one concern is that it has been difficult to develop a consistent core of volunteers who are strongly committed to the project. We have not been able to develop in the community a sense of "campaign". Perhaps this is simply too difficult to do with a subject as abstruse and narrow as hazardous household products, but it is an area we will continue to experiment with as the project develops.

Metrocenter's plan is to build on the experience in Kirkland and conduct a second pilot to test the refined model developed as a result of the Kirkland activities. Metrocenter proposes to select the second pilot community from a more challenging area, most likely in South King County.

Following the success of the second pilot, Metrocenter plans to have a final version of a manual and model ready for replication in numerous other communities. For 1992, we plan to propose to King County, the Department of Ecology, and other governments that a comprehensive Hazard Free Community program be begun, with at least six communities active in 1992 and others in the future.

PROGRAM ELEMENTS AND PROGRESS TO DATE

October 31, 1990

Household Programs

1. Pledge Drive. The pledge drive is more than halfway to its goal, with some 1400 signatures gathered to date. The major push to be completed in the fall includes gathering signatures on election days, a major drive through the schools, and a mailing to all of those who have signed to date asking their assistance. Drive will be concluded in December.

2. Workshops on alternatives. Fifteen workshops have been held to date, with another eight to ten planned.

3. Publicity materials. Brochures, a sticker for pledging households, and two displays have been developed and used for the campaign.

4. Publicity events. The campaign began with a news conference and Toxic Tour of the Mayor's house in April. A second major publicity drive was conducted in conjunction with the visit of the tall ship "Bounty" to the Kirkland waterfront in July. The Hazard Free Community program was the reason the ship came to Kirkland, and staff and volunteers manned an information table for ten days during its visit. An official kickoff for the last half of the campaign was held in early September, with a Fish Ladder communicating the goal for pledge signatures hung in the Kirkland City Hall. A final media event will be held to wrap up the campaign in February.

5. Earth Corps involvement. Youth from Earth Corps have been involved in a number of activities during the first half of the campaign, and will continue to be involved in the fall.

6. School involvement. Several workshops for teachers have been held in the fall; the pledge will be sent home with elementary school students; and a coloring contest will be held for elementary school students.

7. Hazardous waste collections. In addition to assisting in publicizing the visit of the King County Wastemobile to Kirkland in June, the City of Kirkland has already held three HHW collections on its own, and will hold one more in November.

8. Newspaper columns. The Journal-American has run six columns on alternatives to hazardous materials.

9. Store coupon. Four Kirkland grocery stores have agreed to sponsor a coupon giving residents 20% off on a selection of alternatives to hazardous products. The coupon was mailed to all who have signed the pledge to date as part of the fall kickoff, and will be distributed to future signers on the spot.

10. Home Audit workshop. A workshop model for the implementation of a home audit for HHW will be tested in November.

11. Water quality group. Students began stencilling storm drains in October, and a water quality group will be developed to continue activities to promote clean streams and waters. The City of Kirkland has already agreed to provide staff support from this effort after the completion of the Metrocenter project.

Business Activities

1. Business pledge. A business pledge has been mailed out to the 93 Kirkland businesses in the Metro target categories for SQG hazardous materials concerns. The letter was signed jointly by the Mayor of Kirkland and the Executive Directors of the Kirkland Chamber of Commerce and Kirkland Downtown Association. Follow-up calls are being made to ensure that businesses sign the pledge and to provide them with additional information and resources.

2. Business involvement in WIN programs. One Kirkland business was chosen to receive an audit from WIN as part of the WIN Interagency Audit program. Businesses will also be provided information on the Industrial materials Exchange and other options for assistance on hazardous materials problems.

3. Displays in stores. In January, ten displays will be set up in retail stores with information about household hazardous wastes.

4. Model Store campaign. One store will be worked with intensively to become a model store that encourages the use of alternatives to hazardous products.

Government pledge

The City of Kirkland will be asked to sign a pledge similar to those signed by householders and businesses committing it to proper care of hazardous materials and to using alternatives whenever possible.

BACKGROUND OF METROCENTER

Metrocenter YMCA was formed in 1973 to be the community development arm of the YMCA of greater Seattle. Metrocenter's goal is to develop the natural and human resources of Seattle and King County

to deal with the problems we fact as a society. Our continuing strength as a community depends on people working together, and Metrocenter's task is to provide resources and expertise to assist people to help themselves and each other.

Metrocenter operates diverse programs that are looked to as models by YMCA's and other organizations around the nation. The programs that Metrocenter undertakes are designed to help individuals and the community creatively respond to our constantly changing society and to develop greater community self-reliance and individual awareness. Metrocenter works towards the ideal of people taking control of their lives. We work with individuals, neighborhood groups, and local governments to find effective ways to meet the crises and opportunities of changing times.

In 1986, Metrocenter YMCA launched its Hazardous Materials Project as a means of addressing the need to promote community health and stimulate activity in this important area. Metrocenter began this program by initiating the first coordinated household hazardous waste collection day in King County. With its ability, as an outsider to the governmental system, to take risks and bridge conflicts, Metrocenter was able to persuade 15 cities, King County, and several other entities to cooperate in this endeavor.

The May 1987 event was an extraordinary success, drawing over 4,000 households, more than any Collection Day held prior to that time. Since then, Metrocenter has managed succeeding collections for both King County and the Hood Canal Coordinating Council in the Spring and Fall of 1988 and the Spring of 1989, serving a total of more than 20,000 households. In the course of this program, Metrocenter developed a system for conducting such events that includes a complex and sophisticated set of management and operational procedures.

The Hazardous Materials Project has also been involved in several projects to educate the public about the issues surrounding household hazardous materials, as well as programs to involve the business community. Among the projects that Metrocenter has been involved in have been the Seattle Paint Recycling Project, in which Metrocenter served as a subcontractor to Morley and Associates, and the development of the Industrial Materials Exchange (IMEX), in which Metrocenter has served as a subcontractor to the Neighborhood Business Council to develop a plan for marketing IMEX.

Metrocenter is currently contracted to coordinate education, site development, and publicity for the King County Household Hazardous Wastemobile as part of the county's contract with Chempro to manage that facility. The Wastemobile has been an extremely successful program, with over 15,000 households served in the course of the initial program year. Metrocenter's education component of the project has involved the design of two workshops about alternatives to hazardous materials in the home, the training of volunteers to conduct these workshops, and the scheduling and conducting of an average of 6 workshops per month since April of 1990.

HAZARD FREE PLEDGE

I will protect my community, its children, our environment, and the watershed and Puget Sound that we share.

1. If I change my automotive oil, I will NEVER pour it on the ground or down a drain but will take it to a recycler (call 1-800-RECYCLE for a recycler near you, or bring oil to a household hazardous waste collection).

2. When shopping, I will watch for the words DANGER, WARNING, and CAUTION on product labels, and will buy the least hazardous product possible for the job (CAUTION is least, WARNING is next, and DANGER is most hazardous).

3. Whenever I buy a hazardous product, I will strictly follow label directions on safe use and disposal of the product. I will buy only the quantities I know I need, and not buy extra amounts that I might have to dispose of later.

4. For cleaning tasks, I will use "elbow grease" and non-hazardous alternative cleaners like vinegar, salt, or baking soda where these are effective.

5. To control household and garden pests, I will practice careful pest management, using toxic pest control products as a last resort and in strict accordance with the label, and will choose less hazardous alternatives when possible.

6. If I have oil, paints, thinners, pesticides, and other hazardous items that I need to dispose of, I will NEVER do so by pouring them down household or storm drains, onto the ground, or throwing them into the trash.

7. When I have leftover hazardous products, I will use them up according to the label (for solvents and thinners, this may require cleaning for reuse), or give them to a friend who will use them properly.

8. If I have hazardous products that I can't use appropriately, I will save them and bring them to a household hazardous waste collection (scheduled in 1990 for April, June, July, September, and November).

PLEASE TURN OVER FOR MORE INFORMATION!

CUT ALONG DOTTED LINE

Please return to: Grace Steuart, Deputy Fire Marshal
Kirkland Fire Department
123 Fifth Avenue
Kirkland, WA 98033

____ YES, I'll keep the Hazard Free Community Pledge!

Name: _____

Address: _____ Zip: _____

PRINTED ON RECYCLED PAPER

FOR YOUR INFORMATION ...

For information on household hazardous products and wastes, call:

Washington Department of Ecology Hazardous Substance Information Office
1-800-633-7585

Seattle-King County Department of Public Health Hazards Line
296-4692

For information on automotive oil recycling, call:

Washington Department of Ecology Recycling Hotline
1-800-RECYCLE

For information on gardening and house and garden pests call:

Cooperative Extension, Washington State University/King County
Publications - 296-3986
DialExtension Tapes - 296-DIAL

For information on pesticides and alternatives to common household products, call or write:

Washington Toxics Coalition, 4516 University Way N.E., Seattle, WA 98105
632-1545

To volunteer to help the Kirkland Hazard Free Community project, please call:

Grace Steuart, Kirkland Fire Department, 828-1143 or
Richard Conlin or Jane Dewell, Metrocenter YMCA, 382-5013

PRINTED ON RECYCLED PAPER

HAZARD FREE BUSINESS PLEDGE

I pledge to minimize and strive to eliminate the release of environmental pollutants from my business, and protect the health of my employees, the community, and our environment by committing my business to the following practices:

1. Monitor my business' waste stream and identify the types and amounts of hazardous materials disposed of.

2. Never put hazardous wastes down storm drains or sink drains, onto the ground, or into the trash.

3. Read the labels and Material Safety Data Sheets (MSDS) on hazardous products and carefully follow directions on proper use, storage, and disposal.

4. Reduce waste by using non-hazardous or less hazardous materials to replace hazardous materials.

5. Buy only the amount of hazardous materials that are needed for a defined period of time rather than buying in bulk and having excess that might be wasted or be disposed of.

6. Recycle wastes (call 1-800-RECYCLE with any questions) or reuse them in plant processes whenever possible.

7. List surplus materials, by-products, or wastes with the Industrial Materials Exchange (IMEX, 296-4899).

8. Keep waste streams separate, in most cases, to facilitate recycling and reuse, and to reduce disposal costs.

9. When feasible, treat hazardous wastes through physical, chemical, or biological treatment processes to make them less dangerous and reduce their volume (must have approval from Washington Department of Ecology, 867-7000).

10. If I cannot reduce, recycle, reuse, or exchange my hazardous materials, I will contract with a permitted waste management facility to safely dispose of the hazardous wastes.

Please turn over for information sources!

Cut along dotted line.

Please return to: Grace Steuart, Deputy Fire Marshal
Kirkland Fire Department
123 Fifth Ave.
Kirkland, WA 98033

YES! My business will keep the Hazard Free Business Pledge!

Name: _____

Company: _____

Address: _____ Zip:_____

Printed on Recycled Paper

FOR YOUR INFORMATION

NOTE: *Call your Trade Association to discover if they can help you address hazardous waste issues. Some Trade Associations have developed materials to help members reduce, reuse, recycle, and safely dispose of hazardous materials. If yours has not, encourage them to do so.*

For information on recycling and waste reduction, call:
Washington Department of Ecology Recycling Hotline, **1-800-RECYCLE**

For information on hazardous waste regulations for small businesses, call:
Washington Department of Ecology Hazardous Substance Information Office, **1-800-633-7585**

For information on hazardous and solid materials, wastes, and disposal, call:
Seattle-King County Department of Public Health Hazards Line, **296-4692**

For information on materials exchanges, call:
Industrial Materials Exchange (IMEX), **296-4899**

For general information on waste streams and disposal options, call:
Waste Information Network (WIN), **684-2330**

For information on what can go in sanitary sewer drains, call:
Metro Industrial Waste Section, **684-2325**

For information on air emissions, call:
Puget Sound Air Pollution Control Agency, **296-7330**

For information on worker safety, call:
Department of Labor and Industries, **281-5470**

To volunteer to help the Kirkland Hazard Free Community, please contact:
Grace Steuart, Kirkland Fire Department, **828-1143**, or
Richard Conlin or Jane Dewell, Metrocenter YMCA, **382-5013**

KIRKLAND HAZARD FREE COMMUNITY

ALTERNATIVES TO HAZARDOUS PRODUCTS

• DISCOUNT COUPON •

Good for $5 discount when you buy all products or 20% discount when you buy three or more products.
For information on using these alternatives, please call 382-5013.

- **Household Cleaning Soap**, 1 pt. Murphy's, Dr. Bronners or Life Tree
- **Olive Oil**, one 12 - 17 oz. bottle *or* Peanut Oil, one 16 - 24 oz. bottle
- **Baking Soda**, one 64 oz., two 32 oz., or four 16 oz. boxes
- **Laundry *Soap***, one box White King or Ivory Snow
- **Salt**, one 26 oz. box
- **Borax**, one 5 lb, 4 oz. box
- **Lemon Juice**, one 24 oz. bottle
- **Vinegar**, 1 gallon
- **Copper Scrubber**, one 2 pack box
- **Flyswatter**, 1

Expires March 1, 1991.
NOT TO BE COPIED

KIRKLAND HAZARD FREE COMMUNITY

The Hazard Free Community is a project of
the City of Kirkland and Metrocenter YMCA,
with funding from the Puget Sound Water Quality Authority.

Our thanks to the participating retail stores, who have donated
the redemption value of these coupons.

• COUPON VALID AT THE FOLLOWING STORES •

- Puget Consumers' Co-op, Kirkland, 10618 NE 68th
- Larry's Markets, Kirkland store, 12321 120th Place NE
- Safeway, 355 Kirkland Avenue
- Fred Meyer, 12221 120th Avenue NE

Printed on recycled paper

HOUSEHOLD HAZARDOUS WASTE WORKSHOPS

HOME SAFE HOME: Household Hazardous Products and Alternatives, 30 to 60 Minutes

The Home Safe Home workshop introduces the subject of hazardous products in the home, what they are, what they do, and their non-hazardous alternatives. It begins with an introductory slide show that shows how to identify a hazardous product by looking at its label and gives examples of the risks of using hazardous materials. Next, participants take a quiz about hazardous products and wastes and fill out a home audit of different hazardous products they have at home. The workshop leader then initiates a discussion of what people have discovered about the products in their homes, and answers questions. During the third part of the workshop, alternatives to some household hazardous products are demonstrated. Participants will learn how to clean their drains, remove spots, and sweeten the air in their homes without using products that contain toxic, flammable, corrosive, or reactive ingredients. All methods presented, and the in-depth information available in handouts, have been tested and found to be successful. Examples of non-toxic products and alternatives methods will be available for browsing. The workshop closes with questions and discussion.

SOUND GARDENING: How to Protect Water Quality and Your Garden at the Same Time, 30 to 60 Minutes

The Sound Gardening workshop is presented with a slide show that emphasizes the link between what a person does in their yard and the impact it can have on water quality and the environment. Nonpoint pollution and source control are illustrated and explained. Examples of activities in the yard, such as spraying pesticide or applying fertilizer to keep a lawn uniform and green, are traced from the activity to the impact on the environment. This workshop encourages participants to look at their gardening habits in a different light; that a 'perfect' yard must be weighed against the environmental impacts of the practices used to achieve perfection. Alternative methods of gardening and maintaining a healthy and attractive yard are presented. Choosing plant types carefully, using biological controls such as Lady Bird Beetles or pheromone traps, weeding frequently or using floating row covers rather than spraying with pesticides are all suggested as alternative approaches in gardening that can help protect the water quality of Puget Sound. Examples of non-hazardous alternatives will be available for viewing as well as handouts on various gardening problems and solutions. Discussion following the slide show gives participants a chance to find out how to address specific problems.

"INDUSTRY'S EFFORTS ON SOURCE REDUCTION"

5TH ANNUAL U.S. EPA CONFERENCE ON
HOUSEHOLD HAZARDOUS WASTE MANAGEMENT
SAN FRANCISCO, CALIFORNIA

Soonya W. McDavid
Manager of Technical Affairs
Chemical Specialties Manufacturers Association

November 6, 1990

Good morning. My name is Soonie McDavid and I am the manager of technical affairs for the Chemical Specialties Manufacturers Association based in Washington, D.C. I am pleased to be here today on behalf of CSMA and our member companies to discuss "Industry's Efforts on Source Reduction."

First, let me take a moment to describe CSMA and to give you some background on our Association and the industry it represents. Founded in 1914 as a non-profit trade association, CSMA represents companies engaged in the manufacture, formulation, packaging, marketing and distribution of consumer products. These products are for household, institutional and industrial use, including detergents and cleaning compounds; disinfectant and antimicrobial products; automotive specialty products; polishes and floor maintenance products; home, lawn and garden pesticides; and personal care products. In its 77 year history, CSMA has provided scientific, regulatory, legislative, legal and communication assistance on issues of the health, safety and environmental effects of our industry's products to its more than

400 member companies and to all levels of regulatory and legislative bodies. We also have expansive outreach programs to schools, communities and public organizations.

Source reduction is not a novel concept to the consumer products industry, though the term itself is relatively new. While no standard definition for "source reduction" exists, many people agree that source reduction includes activities that minimize the amount of raw materials used in the manufacture of a product, decrease energy consumption, lessen the waste produced and reduce the toxicity of a product. Source reduction is more than just minimizing or eliminating certain products and packaging from the waste stream. It must be accomplished to ensure consumer satisfaction while maintaining product efficacy and safety. For example, many of our members' products require child resistant closures, which places certain constraints on packaging.

CSMA member companies have a long history of improving the impact on health and environmental safety of their products and reducing waste through advancements in product design and packaging, modifications in manufacturing processes, and incorporation of new technologies wherever feasible. For our industry, source reduction entails the long process of research and development and careful laboratory and field testing, often with intensive regulatory scrutiny, before products ever reach the marketplace. Most of the time, effort and capital involved in these changes go unnoticed by consumers, even though source reduction is an ongoing process and, within our companies, a high

priority.

In general, source reduction usually is composed of five key components:

- o reformulation,
- o process modifications,
- o administrative changes,
- o modification of equipment, and
- o changes in packaging design technology.

All these components may be evaluated by companies to achieve meaningful source reduction. My discussion today will focus on reformulation, where the potential toxicity or hazard of products to health or the environment has been reduced or eliminated. In addition, I would also like to say a few words about product packaging, which is an integral component to source reduction for the consumer products industry.

Reformulation incorporates alternative chemicals where feasible in place of those in current use in a given application. As new emulsifiers, solvents, surfactants, fragrances and active ingredients are developed and tested, manufacturers determine if and how these new compounds can be incorporated into their product lines.

Human health and safety as well as environmental fate, among numerous other factors, are extremely important and are routinely assessed by companies before any reformulation is considered. When determining whether to reformulate a product, a thorough evaluation of all material properties, costs and benefits are also evaluated. Flammability, corrosiveness, reactivity, acute

and chronic toxicity, product efficacy and quality, raw material and disposal costs, legal and regulatory requirements and other such factors are reviewed to best understand the risks and benefits of each new or reformulated product. These evaluations consider not only the proper use of the product according to the manufacturer's label, but also any reasonably foreseeable misuse or abuse.

Despite the complexity of making changes to existing products or creating new ones, the chemical specialties industry has many examples of source reduction in which product formulations have been changed in response to improved technology. I would like to share a few of these accomplishments with you today.

In the 1970s, companies reformulated most household insecticide products, which once contained chlorinated hydrocarbons as active ingredients. Manufacturers and regulators were concerned that the chlorinated hydrocarbons persisted in the environment. As a result, industry focused on using other active ingredients such as non-persistent/short-lived organophosphates, carbamates, pyrethrins and pyrethroids. Industry also made the products more convenient and safer for consumers to apply by introducing ready-to-use pesticides.

Today, household pesticides are more effective at eliminating unwanted pests and degrade more quickly in the environment. Our products provide for the continued safety of those who distribute, use and ultimately dispose of the containers and ensure environmental integrity for future generations.

In addition, many products including pesticides, cleaners, preservatives, paints and adhesives are now water-based formulations or incorporate solvent substitutions and reductions. Designed to be as effective as previous products, these water-based products do not pose undue health, safety or disposal concerns.

Changes in formulation have also taken place in the antimicrobial sector of the chemical specialties industry. A major use of antimicrobials is as preservatives in household products such as dishwashing detergents, fabric softeners, polishes and floor maintenance products, cleaning preparations, paints and personal care products. As preservatives, antimicrobials prolong the shelf-life of a product, which in itself contributes to source reduction, and protect consumers from infections. A preservative occasionally used until about 10 years ago was formaldehyde, but concerns over the potential health impact on workers and consumers who were exposed to formaldehyde raised questions in our industry about its continued use. Even though the trace quantities of formaldehyde in chemical specialty products presented no actual known risks to consumers, companies began seeking alternatives and have incorporated these new perservatives in today's products.

Source reduction is also evident in the detergent sector. Many of the detergent manufacturers have introduced concentrated formulas by eliminating excess water in liquid formulas and some "flow-aids" such as sulfates in granular products. These innovations allow consumers to use less of the product to

accomplish the same goals, while they save on energy costs and associated pollution needed to transport the products through the distribution chain. Additionally, laundry detergents formulated to be effective in cold water have lowered energy use by consumers. If you consider that source reduction involves not only the elimination of unwanted materials in products, but also the reduction in energy and wastes required to bring a product to market, these new detergent formulas clearly represent less raw material consumption, more efficient energy use, and reduced packaging, and therefore, require less waste disposal. Detergent formulas also now incorporate more protein enzymes which aid in stain removal. This allows formulators to greatly reduce the levels of other ingredients such as surfactants in the products. Like many surfactants, these protein enzymes rapidly degrade in the environment. In addition, laundry pre-wash and stain removal products have substantially reduced their use of organic solvents by replacing them with biodegradable surfactants, which reduces the volume of the product needed.

Household cleaners and laundry detergents represent categories of products with a long history of environmental improvements. In the 1960s, for instance, concerns were raised about the poor biodegradability of branched-chain alkyl benzene sulfonates (ABS), a type of anionic surfactant that was in laundry detergents and other cleaners. This resistence to biodegradation raised concerns for water treatment operations. Our industry invested $100 million to voluntarily change to readily biodegradable linear alkyl sulfonates (LAS) surfactants

in household cleaning products. The development and introduction of new biodegradable surfactants has continued into this decade.

Recently, I was told by one of our industrial and institutional (I&I) floor maintenance companies of a new development in floor care maintenance products, in which raw material suppliers have made available non-zinc polymer technology to their customers. While this metal is not a concern in household floor care products, this new technology will allow companies to reduce the zinc content in commercial polishes and still maintain product safety and efficacy. It is important to remember that a consumer using a less effective product will be tempted to use more and more to get the job done, increasing both waste and exposure.

The automotive specialty products sector has also another "toxic" source reduction reformulation. For many years, sodium nitrite was a standard anti-corrosion chemical used for rust protection. However, under certain temperature and pressure conditions and in the presence of amines, sodium nitrite can potentially form nitrosamines, a suspected carcinogen. This was a concern in the I&I sector of the consumer market. Subsequently, most automotive cleaning and lubricant suppliers and manufacturers have developed nitrite-free automotive products with equal or better rust protection.

As I mentioned earlier, a more complete review of source reduction must include current trends in packaging design. While I have mentioned several examples of source reduction through advances in product reformulation, the current focus on source reduction efforts is in more efficient packaging of consumer

products, the use of recycled materials and packages which are recyclable. For example, most plastic containers now have the SPI coding to aid in recycling efforts.

Source reduction as applied to packaging may include reductions in weight and/or volume, changes in the use of materials and composite materials, improvements in package and product design, bulk packaging, materials substitution and replacement of heavy metals in inks and dyes. Recently, one of our members announced that it would commit to using at least 10 million pounds of recycled plastic annually in its household product bottles. Many more of CSMA's members have likewise made similar commitments to using recycled materials, using less or modified packaging where safety allows, and encouraging recycling efforts. In addition, some members are launching products in refill packages, where consumers pour the contents into a reusable container. This reduces solid waste by as much as 75% when compared to conventional plastic bottles. "Bag-in-box" packages are also used and they greatly reduce the amount of packaging by eliminating the need for corrugated shipping containers.

While the consumer products industry has taken many steps throughout its long history to contribute to source reduction--from formulating new products to adopting innovative packaging ideas-- CSMA and its member companies believe ultimate solutions to our waste problems must commence with proper education and public awareness. Companies will continue to reformulate and devote substantial resources to R&D to develop less hazardous

alternatives where feasible. But it is our joint responsibility --as industry and public officials--to educate and inform consumers about what steps they can take to contribute to source reduction. To this end, CSMA has been and will continue to distribute valuable information about the proper use, storage and ultimate disposal of household products. In keeping with industry's commitment to provide valuable information, the Household Products Disposal Council will distribute a new brochure next year that will include information on recycling.

In conclusion, source reduction is the obvious first step in an integrated program of waste management that encompasses all aspects of a product's life-cycle. Improvements in extraction, refining, manufacturing, transportation, storage, use, re-use, and ultimate disposal are keys to ensuring that we are efficiently using our resources. The consumer products industry is concentrating on using more efficient materials and designs, making products more concentrated, offering a range of product sizes to fit different consumer needs, developing reusable containers, utilizing recycled materials, using less packaging, minimizing the waste associated with the manufacture of consumer products and encouraging others throughout the distribution chain to contribute to material conservation wherever possible. The chemical specialties industry will continue to evolve as new formulation and packaging technologies are developed in response to changing market demands and regulatory requirements.

The examples discussed earlier indicate industry's willingness and ability to provide consumers with environmentally conscious products without jeopardizing product safety and efficacy. We will continue to evaluate our products on matters of health and safety, and we will continue to minimize any potential adverse environmental consequences attributed to our products, packaging and operations. This is in the best interest not only for us as an industry, but for us as consumers and citizens.

Vermont's Consumer Information Program

Michael Bender

As Vermonters begin to pay the cost of household hazardous waste (HHW) collection, recycling and proper disposal, there's a growing interest throughout the State in encouraging consumers to change their buying habits and reduce the use of hazardous products. Educational programs that promote source reduction through consumer changes are clearly justified for both environmental and economic reasons.

The economic advantages to reduce HHW through source reduction become clear when comparing costs of hazardous and solid waste disposal. Proper hazardous waste disposal usually costs at least ten times as much as solid waste disposal. Currently, the cost of hazardous waste disposal is increasing at an average rate of between 15%-20% per year. Coupled with the risk of environmental contamination, liability and clean-up costs, there's an ever increasing incentive for Vermont to realize significant savings through strong educational programs that promote hazardous use reduction.

Vermont's new hazardous waste legislation, Act 282, makes toxic use reduction a top priority and requires regional solid waste plans to include an unregulated hazardous waste component "to reduce the toxicity of the solid waste stream to the maximum extent feasible". In addition, Act 282 has a Consumer Information section that requires retailers to label shelves wherever hazardous

products are sold. Vermont's program is scheduled to begin in early 1991 and is intended to promote awareness of the following: health and safety risks associated with the use of hazardous products; the need to reduce the use of hazardous products; and proper disposal of HHW.

A key component in the development of Vermont's consumer information program was the selection of a shelf label logo that both encouraged toxics use reduction and stimulated consumer interest in the goals of the program. Act 282 joins program elements together by requiring retailers to make pamphlets (that have the logo on the front) available to consumers at point of purchase. These pamphlets will describe the toxicity of hazardous products and alternative products. State initiatives will also include accompanying media information to promote the program. Other public/private efforts will be coordinated by regional solid waste districts.

Regional waste districts are in the process of developing educational programs that promote reduced use and proper disposal of HHW. Districts are planning on distributing educational pamphlets at recycling centers, HHW collection events, and community centers. Public forums, community meetings and informational sessions on solid waste are being planned to promote toxics awareness and reduction (i.e. town meeting day, planning commission meeting etc.). Letters to-the-editor, public service

announcements, citizen task forces, and contacting community leaders, retailers, and manufacturers are additional ways to reinforce State goals to reduce toxic and hazardous product use.

The private sector is also responding to Act 282's top priority of toxics use reduction. The Association of Vermont Recyclers is developing a HHW supplement to their Teacher's Resource Recycling Guide, which will be sent to all public school libraries. Teacher workshops will be conducted on the new HHW supplement and the State's shelf labeling program will be highlighted. Another example of private sector involvement was demonstrated by Hannaford Bros. grocery stores, who printed messages on grocery bags that encouraged consumers to reduce hazardous product use and dispose of HHW properly.

In conclusion, the centerpiece of Vermont's consumer information program is its hazardous product shelf labeling program. It's clear that changing consumer habits makes good economic and environmental sense. The Vermont Retailers, Districts and State are working together in the development of this important program. Before hazardous product shelf labeling becomes mandatory, retailers have nine months to try out the program. Consumer information programs will be promoted through media coverage, school education programs, and a combination of public and private efforts.

The future success of Vermont's shelf labeling program can be measured in several ways. A obvious gauge of program visibility will initially be determined by the number of retailers volunteering to participate, followed by another percentage who choose to comply when the program becomes mandatory statewide. Consumer polls can determine program effectiveness, and in addition, identify specific consumer preferences. Finally, program success will become evident when commercially available substitutes become increasingly available on store shelves. The key ingredient in the change, of course, is heightening consumer interest. This, in turn will increase consumer demand and the availability of alternative products.

CONSUMER BEHAVIOR AND ENVIRONMENTAL MANAGEMENT

Richard P. Wells
Vice President
Abt Associates, Inc.

Historically in the United States we have approached environmental management as a matter for command and control regulations mandated by federal or state governments. Although command and control regulations will remain the core of our approach to environmental management so long as the social and private costs of human activities differ, a new phenomenon with important implications for environmental management has begun to emerge recently. This phenomenon is consumer environmentally-oriented purchasing behavior. Predictably, this topic has been the subject of extensive research concerning the significance of environmental attributes in consumer purchase decisions. I would like to address two issues related to this topic:

- What are consumer doing now? and
- What can we do to channel consumer purchases into directions that are most beneficial for the environment?

What Are Consumers Doing Now?

In the last two weeks of August, Abt Associates conducted a survey of consumer environmentally-oriented purchasing behavior. I recognize that this is neither the first nor the last environmental consumer survey conducted in the past year. Our survey was somewhat different, however, in that it focused on actual behavior rather than on attitudes or a stated willingness to purchase environmentally-sound products. The key question we asked was: "In the past six months have you purchased a product because you believed it was better for the environment than another product you considered?" We then asked respondents who had made such purchases to describe the product, the environmental reason for selecting it and its attributes relative to competing products (price, quality, effectiveness, availability, etc.). We also asked

about consumer actions in the past six months to avoid (boycott) a specific product or company on environmental grounds and, for purposes of comparison, about consumers' willingness to pay more for hypothetical environmentally-sound products.

The results of the survey demonstrate a very strong environmental consciousness among consumers and a willingness to translate this consciousness into purchase decisions. Over one half of the respondents (51 percent) had made at least one environmentally-oriented purchase decision -- about one-third had bought a product, one-third had both bought a product and boycotted a product or company and one-third had done both. The percent of consumers who had actually made environmentally-oriented purchase decisions, however, is substantially lower than the 90 percent of consumers who said they would be willing to pay more for an environmentally-sound product.

We believe that actual purchase decisions provide a more reliable basis to evaluate the level of environmental consumerism than stated willingness to pay. The true size of the environmental market probably falls between the 51 percent who had actually made an environmental decision and the 90 percent who said they would. Methodologically, as we have found with political polling, survey respondents will often tell an interviewer what they believe the interviewer wants to hear. On the other hand, the magnitude of the difference between behavior and attitudes also suggests there is a substantial unmet demand for environmentally-sound products.

That's the good news. The bad news is that at least 40 percent of the products purchased were not particularly advantageous for the environment. Thus, the problem is not so much to create consumer demand for environmentally-sound products as it is to channel this demand in directions that will be most beneficial to the environment. Seventeen percent of the products purchased were so-called "biodegradable" plastic bags and an additional 25 percent were non-aerosol products purchased because they were free of chlorofluorocarbons (CFC's). While there are good environmental reasons for buying non-aerosol products (largely because the other propellants used are not benign and because non-aerosol products involve less packaging) consumer aerosol products have not contained CFC's for 12 years.

It is also disturbing to compare consumer environmentally-oriented purchase decisions to the environmental priorities recently outlined by EPA's Scientific Advisory Board (SAB). According to the SAB the highest ecological priorities are those that involve the potential for

long-term irreversible damage -- global climate change, stratospheric ozone depletion, habitat alteration and species extinction. In human health terms the SAB gave highest priority to direct routes of human exposure. These areas are not particularly well-addressed by consumer purchase decisions that focus primarily on solid waste concerns.

In particular, from a household hazardous waste and an environmental perspective two areas of concern are underrepresented in consumer behavior -- energy efficiency and toxic ingredients. Energy efficiency may well be the major environmental problem that we face not only because the consumption of fossil fuels generates CO_2 emissions that have been linked to global climate change (the EPA SAB's top ecological priority), but also because of other air and water pollutants associated with energy production, generation and consumption. Despite the environmental importance of energy efficiency, less than 1 percent of consumers who purchased a product based on its presumed environmental benefits did so because the product was more energy efficient.

From a household hazardous waste perspective another important area is the "less toxic ingredients" motivation for purchasing environmentally-sound products. About 8 percent of the individuals purchasing products they considered environmentally-sound did so because they believed the products contained less toxic ingredients. The largest component of these products is household cleansers -- about 5 percent of all products purchased as being environmentally sound are household cleansers containing less toxic ingredients. Other products include food products (where the toxicity in question is more toxicity to consumers than to the environment), paper goods (dioxin), lawn and garden products, personal care products, gasoline and appliances. Although many types of products were purchased, the important point remains that the proportion of products that were purchased because they contained less toxic ingredients is far smaller than is the proportion of products that were purchased because they were considered biodegradable, CFC-free or recycled.

The disparity between the proportion of products purchased because they contain less toxic ingredients and the proportion purchased for other reasons suggests the need for greater emphasis on the toxic constituents of consumer products. As their environmentally-oriented purchases suggest, consumers are willing, indeed anxious, to make purchase decisions based on environmental considerations. What we have seen, however, is that consumer purchases have been concentrated on products addressing those issues that have gotten their attention --

municipal solid waste and CFC's. Without minimizing these issues, we can say that efforts to increase the
visibility of household hazardous waste issues could be used to focus consumer purchases on products that are less toxic in the household hazardous waste stream.

What Can We Do to Influence Consumer Purchase Decisions?

The survey also sheds some light on methods to influence consumer purchase decisions. Essentially, it suggests three groups of consumers:

- Well-informed individuals who base purchase decisions on multiple sources of information;
- "Impulse buyers" who base decisions on a single source of information, generally at the point of sale; and
- Non-environmental buyers who to date have not based their purchase decisions on environmental considerations.

It seems to me that to have a significant effect on household hazardous waste management we need to focus on the last two categories. To focus on individuals in the first category would, to some extent, be "preaching to the choir." These individuals are already basing purchase decisions on environmental considerations. It will, however, be important to ensure that this group of individuals receives accurate information.

The second and third groups constitute at least three quarters of the population; for this reason, it is essential to affect their behavior if we are to have a significant effect on household hazardous waste generation. In terms of their environmental purchasing behavior, this group appears to consist of impulse buyers. They do not actively seek out environmentally-sound products. They can, however, be affected at the point of sale by an environmental message.

In our survey, we found that consumers who relied on a single source for information concerning the environmental attributes of a product were more than five times as likely to rely on the label as on any other source of information. By contrast, consumers who relied on multiple sources were only twice as likely to rely on the label as on other sources. This is not in itself a startling finding -- it basically tells us that well-informed individuals read or hear about a product through various sources and then select the product by referring to the label, while less well-informed individuals tend to look only at the label. The important point to keep in mind

is, however, that if you want to affect the less well-informed consumers who make at least three quarters of the purchase decisions, you have to focus on the label.

Our survey results also suggest that consumers may sacrifice some other attributes such as price, effectiveness, or appearance. About 31 percent of the individuals who purchased products they considered environmentally sound paid more for their products, but about 11 percent said they paid less and 53 percent said they paid about the same. Interestingly, about the same proportion (20 percent) felt the environmentally-sound products were superior in other respects such as appearance or effectiveness, as thought these products were inferior.

To summarize the study findings in terms of their relevance to household hazardous waste management, the points to keep in mind are:

- Although 51 percent of consumers are making environmentally-oriented purchase decisions, most are focusing on solid waste capacity issues, not on the toxicity of the ingredients in products. It appears consumers would be receptive to a message focusing on toxicity of ingredients, but much greater educational efforts are needed.

- If we are to have a substantial effect on consumer purchasing behavior, we need to focus our efforts on the product label. This is overwhelmingly the source of information relied on by consumers who have only a single source of information, and whose behavior must be affected to make a substantial dent in household hazardous waste generation.

- While consumers may (and do) accept some sacrifices in price, convenience, effectiveness, or appearance to purchase environmentally-sound products, these sacrifices are likely to be limited. Environmentally-sound products will in most cases need to compete on an even footing with other products.

EDUCATING THE PUBLIC FOR BEHAVIORAL CHANGE Tuesday, November 6, 1990 8:30 am-10:00 am

Using Television for Public Education
Nancy Kramer Bickel, Producer-Writer, **Cleaning Up Toxics at Home**
League of Women Voters of California Education Fund

How did the League produce **Cleaning Up Toxics at Home**, the television program that many of you saw--and apparently liked--in the opening session of this conference?

The League had been producing award-winning documentaries on environmental topics with a bay area commercial television station for several years--among them Toxics Chemicals: Information is the Best Defense and Can I Drink the Water? After deregulation, the station dropped its community affairs programming and was no longer interested in working with the League on joint productions. I had been working with a committee of League members who were expert in hazardous materials issues. We thought it was important to continue getting the good information the League gathers out to a large public through television.

We identified needs. We looked for gaps in public information in the committee's area of expertise. We identified two needs. First, we recognized that polls showed that most people were very concerned about pollution but had little idea of simple practical steps they could take to reduce their own impact on the environment. This was back in 1988, before Earth Day made many of these things familiar to a larger audience. This was the start of the program you saw: **Cleaning Up Toxics at Home.**

Second, we realized that few people know that environmental laws are being extended to many small businesses. and that small businesses often lacked the capital resources and expertise to comply easily with complicated laws--and to stay in business. Pollution prevention and waste reduction were the most appealing ways for such businesses to protect the environment and stay in business. So we looked for good examples to illustrate how small businesses were managing and could manage. This is the core of our second program: **Cleaning Up Toxics in Business.**

We identified a primary target audience--the general public that watches commercial television. **We identified secondary audiences**--for "Home", schools, environmental groups, and the public officials who manage hhw programs.

We wrote a proposal and raised money--$122,500 of our goal of $125,000. This took us about 9 months--rather speedy as these things go. We got a broad range of funders, from people whose business is waste to manufacturers of household cleaning and pesticide products to drinking water and waste water districts. If you had to produce similar programs at market rates, these programs would probably cost about $200,000; but because I and the other staff and committee members contributed much of our time, we needed to raise less money.

We did research. We went to lots of meetings, did lots of interviews, read lots of papers--learned from lots of folks like yourselves what the key issues were in these areas, what the major problem materials were, how various solutions--from one day roundups to permanent sites--were working out.

We simplified and simplified and boiled down and simplified some more. We tried very hard to get rid of every bit of jargon. To the general public SQG doesn't mean small quantity generators and generators does not convey the notion of folks who throw away hazardous waste. Our goal was a program that was non-didactic, lively and fun--but that was still completely accurate in its generalizations.

We used top-notch television professionals--Jan Hutchins as host and narrator, top of the line cameraman and audio tech and a skillful editor. Thanks to years of on-the-job training as a League producer with a television station, I can now handle the writing and producing. But I find it's absolutely essential to work with technical people with a track record, whose previous work you can look at to make sure in advance they can do the job to the level you need it done for the uses you plan. You need to match the expertise of the technical people to the expectations of your audience, or you'll just waste your money. If they'll work for free, or at a reduced rate for a good cause, great--but they have to be able to do the job right.

A year to raise the money. A year to produce it. Now we're facing distribution, which is probably the most important part. It will also take about a year of full time effort. We will be seeking national broadcast or cablecast of the programs. We hope that many of you will adopt the program to help you in your own public education efforts around the country--to show on local television or to local community groups. Tapes are available from our distributor, the Video Project in Oakland.

ADVICE

University of California Cooperative Extension
Information for Community Education and Development Personnel

TELL A FRIEND: A BRIEF ON SOCIAL MARKETING

James Grieshop

In the early 1980s the slogan "Tell a Friend" became the cornerstone of a marketing campaign for a major California retail food chain. The use of this slogan indicated that the company had a clear understanding of the power of interpersonal networks as a means for promoting products and the company. Interestingly, the company promoted these interpersonal networks not through interpersonal networks, but through the mass media of TV, newspapers and radio. What emerged was a unique blend of interpersonal communication networks and mass communication media. This blend was a demonstration of an understanding of a basic marketing principle—the need to utilize both personal and mass media in order to achieve company goals.

But what does marketing, especially business marketing, have to do with education or diffusion of innovations? Quite succinctly it was everything to do with these practices. As the CEO of CitiCorp recently stated: "The essence of marketing is solving consumer's problems."

The message here is: good extension education is good marketing—rightly understood. Business marketing, in addition to using networks and media, puts strong emphasis on market analysis and audience segmentation. Also important to marketing management are the "4 P's"—Product, Price, Promotion and Place (Kotler 1970). To a major extent, these elements—communication channels, market analysis, audience segmentation, the 4 P's—are the principle components of business marketing. This same combination of principles and their adaptation is central to the educational/problem solving approach called social marketing.

MARKETING—RIGHTLY UNDERSTOOD

Marketing is one means to link research based knowledge with practical problems. It aims at solving consumer problems. Marketing implies predetermined needs of the consumer, and not solely predetermined preferences of the producer. This difference is crucial. An emphasis on needs of the consumer distinguishes marketing activities from sales [The distinction between sales and marketing parallels that of the distinction between Diffusion of Innovation and Information Seeking (Donohew and Springer 1980)]. It is this distinction that is vital to understanding the true marketing process, including social marketing.

Marketing is an exchange process based upon need in which the product or service developed is exchanged in return for something that satisfies the producer. In sales, emphasis is put upon the production of a goods or service, whether or not it meets a need. Often, a product or service is developed with little regard to the true needs of the client or consumer. The focus is upon selling or persuading a consumer to purchase or adopt whatever is involved. However, marketing—rightly understood is a management practice which attempts to increase the probability of adoption. This probability is a function of the understanding of the needs and preferences of the consumer or client.

Many industries like IBM, 3-M and John Deere are involved in problem solving. That is, once a consumer problem has been identified, attempts are undertaken to develop practical solutions that will be used by clients. This development process is essentially one of research and development. However, R & D by itself is not enough. Marketing becomes an essential ingredient that aims at the dissemination or diffusion of the product from the producer to the consumer. It is the link between the problem and R & D.

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In the industrial section, as well as the agribusiness sector, examples of R & D work for developing products and services are plentiful. Also in the industrial sector there are found many examples of marketing approaches to disseminate the product from the producer to the consumer. The current interest in well managed, i.e., "excellent companies," is, in effect, an interest in their R & D plus marketing procedures.

SOCIAL MARKETING

Philip Kotler defines social marketing as the "design, implementation and control of programs, seeking to increase the acceptability of a social idea or cause in a target group. It utilizes concepts of market segregation, consumer research, concept development, communication, facilitation incentives, and exchange theory to maximize target group response" (Kotler 1984). In short, social marketing is the application of marketing principles to social causes and ideas.

In the last decade social marketing activities have successfully been developed in a variety of areas including health care, higher education, environmental protection, energy conservation, nutrition, the arts, public transportation, family planning, mental health and safety education. Increasingly, there has been interest in social marketing as people and organizations seek to find effective ways to diffuse and to insure the adoption of social ideas and practices.

Social R & D, in which needs are identified and attempts are made to research and develop products/services that meet these needs, parallels industrial R & D. Social marketing is that marketing process which attempts to disseminate or diffuse the social practice or service from the producer to the consumer (or link the problem with the R & D process).

Market research is the process through which needs and preferences of the audience are identified and understood. Market research involves the use of many techniques, including focus groups and individual interviews, survey data, questionnaires, as means to understand the "market" and their needs. For social marketing, regular communication and an exchange of information between the producer (or developer or diffuser or educator) and the consumer are musts.

Audience segmentation is increasingly recognized as important to market research. Through this process an audience is segmented (or broken down) into various segments, each one different from every other in particular ways. Demographics, i.e., age, gender, race, is a traditional element used to segment audiences. In recent years, other elements have been introduced. Currently in fashion is psychographics with attempts to understand the values, attitudes and lifestyles of audiences (Mitchell 1981). Psychographics has had a dramatic impact upon the business community and just now is entering into the social marketing arena. Other elements used for audience segmentation include socioeconomics, geographic and communications, i.e., networks.

Good market management practice, as Kotler argues, focuses on the 4 P's—***Product***, ***Price***, ***Promotion*** and ***Place***. Social marketing is no different. Too often marketing is seem simply as a form of promotion—that is advertising. In the social area too much emphasis has been placed upon social advertising or social communication, with a heavy use of mass communication. In the social marketing of ideas, e.g., good eating or pro-community behavior, an integrated approach using the 4-P's increases the probability of the adoption.

The ***product***, either in business or social organizations, is the service or the goods developed or designed. Market research and audience segmentation aim to analyze the needs and wants of target audiences and to design products responsive to these audiences. The product in social marketing is often more difficult to design since in cases such as personal health, e.g., better nutrition, social betterment, e.g., a better environment, or altruistic causes, e.g., recruiting volunteers, the products are nontangible. Such products are different than crackers or canary seed. Therefore, in the management of the product it becomes extremely important that the social marketer define the change sought, i.e., values, beliefs, behavior or a combination of these.

Promotion includes a number of different activities: advertising, personal selling, publicity and sales promotion. Communication, both interpersonal and mass communication and persuasion are elements of promotion. The style of promotion, e.g., the "hard sell," should not be confused for promotion itself. In well designed and managed social marketing efforts, an integration of these activities would be exhibited (e.g., "Tell a Friend" via TV).

Price is the cost to the client. Money is one element of the price variable, but not the only element. Other costs include psychic energy and opportunity costs. For example, a user or client, through his or her own analysis, may identify certain risks involved in adopting a practice, and these risks must be understood by the marketer, social marketer or educator.

Place refers to the points at which the market exchange relationships occur. What channels for distribution and for response exist? In short, where do you buy a sign up for the product? This may be through a phone system, through a community communication system in existing neighborhood organizations, through libraries, and through user groups, or directly with an advisor.

Extension education strategies must have room for social marketing. Good extension education is both good marketing and good social marketing—rightly understood. Those involved in extension education programs need to learn quickly and accurately from experiences of marketers and social marketers. If we are unsuccessful in diffusing (or marketing—rightly understood) goods and services produced from the University R & D System, then all is basically for naught. Therefore, we need to understand and master the skills of market research, audience segmentation and marketing management (including the 4 P's). Not only must we focus on innovations looking for problems, but also on problems needing an innovation.

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JIG/atl

11/90

LA County Sanitation Districts -- One Day
Joseph D. Reilly

INTRODUCTION

During the months of April through June, 1990, the Los Angeles County Sanitation Districts and the Los Angeles County Department of Public Works jointly sponsored four one-day household hazardous waste roundups. More recently, a fifth roundup was conducted on October 20, 1990. All five roundups were extremely successful in terms of attendance, but our first event, the April 28, 1990 roundup at the Rose Bowl in the City of Pasadena, was particularly noteworthy. When the gate finally closed, the tally reached 4,200 cars. In total, we collected almost 1,000 drums of miscellaneous waste, which included 12,000 gallons of paint, 5,500 gallons of used motor oil, and 550 used car batteries in a little over six hours. Our contractor handled an average of 700 cars per hour!

To be honest, we expected a large roundup, but certainly not 4,200. There were many factors that contributed to this. First and foremost was demographics. Los Angeles County is made up of 86 incorporated cities plus several large unincorporated areas. 1990 census figures have revealed that the total cumulative population of the County is slightly over 8.7 million. Of course these are just the people who have been counted. One can only speculate what the actual population is. With that kind of population, any operator of a free household hazardous waste collection day should have no trouble gathering a crowd.

The largest incorporated city in Los Angeles County, of course, is the City of Los Angeles. The 1990 census has estimated the City's population to be slightly less than 3.4 million. In 1989/90, LA City conducted eight one-day roundups for its residents. Their largest roundup attracted nearly 2,500 people. It was thought that the County's program could attract a crowd at least as large.

Secondly, the time of year that we conducted the roundup worked in our favor. Granted the Southern California area doesn't have much of a winter, but spring cleaning is as popular here as anywhere in the United States. To add icing to the cake, Earth Day was Saturday, April 21. Our roundup stood to gain from all the environmental awareness that had been generated for the weeks prior to Earth Day .

Lastly, within five miles of the Rose Bowl were the Cities of Pasadena, South Pasadena, Glendale, Sierra Madre, Arcadia and the community of Altadena. Most of the homes in these areas are 40 years old or more. In addition, the majority of the residents are older, college educated, and middle class. Their garages, basements, and cabinets were ripe with a vast array of unwanted household toxics ranging from drain cleaner to banned pesticides such as DDT and Chlordane. It didn't take much convincing to motivate people to bring their materials to the roundup. Additionally, the City of Pasadena took it upon themselves to help advertise the event. While the County's public information program consisted of flier and poster distribution, public service announcements, and newspaper advertisements, the City of Pasadena contributed to the advertising effort through direct mailings to their residents, and their own newspaper advertisements.

Generally speaking, two elements come into play when estimating a participation rate for a household hazardous waste roundup. The first is a ball-park figure that you will probably hear elsewhere at this conference, and that is a roundup operator can expect a participation rate of between 0.5% to 2.5% of the target population. The second factor is the socio-economic makeup of the target population. We have found during the course of conducting our roundup program that more middle and high income households seem to take advantage of the collection days than the lower income groups. Whether this is because lower income groups have less of what they consider waste to dispose of, or whether more education programs are needed to teach particular target groups about certain risks is another subject that may be covered elsewhere during the conference. As it turns out, the Rose Bowl roundup was targeting a middle to high income area. The combined population of the target cities was slightly more that 390,000 people according to the 1990 census. Still to expect that even 1% of the population would participate seemed a little too optimistic. Just in case, however, we had the personnel and equipment on site to handle that number, but 3,900 still seemed a bit too high. I was expecting between 2,000 and 2,500.

SET-UP

I'm not going to dwell a great deal about the contractor's waste collection set-up. The contractor we hired had extensive experience conducting these sort of programs, and quite frankly, were the experts. Their proposal was good, and their references acceptable. In general, the Sanitation Districts would not have hired a company who had not already performed such programs. It was just not in our best interests to be a guinea pig for a first timer. The operations plan looked feasible, and we were issued a variance from the California State Department of Health Services. The contractor was fully aware of the population of the surrounding area, and the potential for attendance. Short of asking a few questions, and checking their emergency response plans, I really didn't feel qualified to question their set-up. After all, if they didn't perform in a manner that was acceptable, they wouldn't be hired again, and I'm sure they were aware of that.

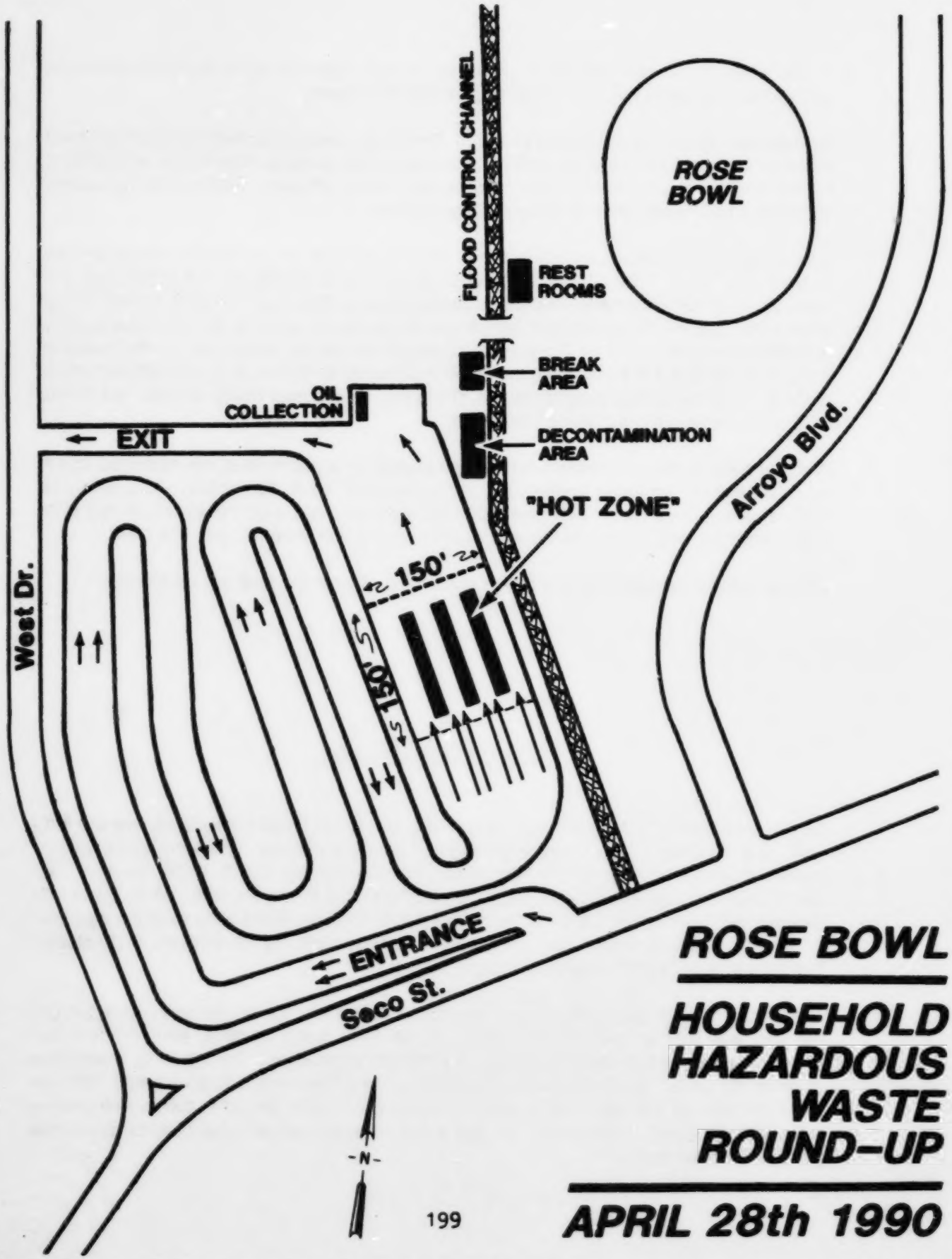
With regard to the traffic set-up, I believe the single most important element to properly manage a large household hazardous waste roundup is space. While the actual drop off area (what the contractor likes to call the "hot-zone") was roughly 150' by 150', the area we needed for traffic control was roughly four to five times larger.

As was mentioned before, LA County had the added benefit of witnessing the City of Los Angeles set up and run several large HHW roundups. As a matter of fact, the previous week on Earth Day, the City co-sponsored a 1,500 car collection day with the Unocal Refinery in Wilmington. Fortunately, I was able to volunteer my services at their roundup and observe how they managed their traffic.

In order to accommodate the anticipated traffic, a series of queuing lanes had to be constructed. The goal of these queuing lines was two fold. First, we wanted to get as much traffic off the main drives as possible, and secondly, the lines gave us an opportunity to concentrate the traffic in one area so we could take questionnaires, hand out informational fliers, and open the trunks of the cars.

The site given to us by the Rose Bowl was clearly large enough for all of our requirements. The contractor staff arrived Friday morning to begin setting up their equipment. I arrived that afternoon to try to coordinate the queuing lane construction. Unfortunately, the traffic cones that I requested were not on site yet, so I described to a worker, upon delivery of the cones, how I wanted to construct the queuing lanes. I returned to my office to tend to some last-minute arrangements unaware of the impending trouble that decision was about to bring.

The following day, I arrived on site at 6:30 am to discover that the traffic queuing lanes had not yet been set up. To compound matters there were several cars parked right in the middle of the area where we wanted to place the queuing lanes. With the actual collection event not scheduled to open until 9:00 am, and all my traffic volunteers scheduled to arrive at 8:00 am, I just figured that the cones were going to arrive that morning, and the cars belonged either to the contractor or some early morning joggers.



ROSE BOWL

HOUSEHOLD HAZARDOUS WASTE ROUND-UP

APRIL 28th 1990

At that point, there was nothing for me to do, except organize some work assignments, and prepare a safety talk that I was to give the volunteers.

By 8:00 am, panic was beginning to set in. The cones had not arrived, the cars were still parked in the middle of the lot, and by now, early bird roundup customers were driving haphazardly through the lot wishing to drop their waste off early. Fortunately for me, my volunteers had finally arrived; roughly forty of them.

Just when it looked like we were going to have a disaster on our hands, things started to go in our favor. The City of Pasadena city yard was literally up the block from the Rose Bowl. A call was made, and some cones were on their way. It was 8:10 am. There were a few saw-horse barricades by the entrances to our parking lot which we quickly commandeered to close off the portion of the lot where we would set up the queuing lines. We managed to track down the owners of the parked cars, and got them removed, and we corralled all the early birds out of the lot. The cones finally arrived, but it was 8:25, and we weren't out of the woods yet.

With the help of the volunteers, and a quick sketch on a paper pad, we managed to set up a reasonably workable pattern of queuing lanes all within 30 minutes. The time was 8:55. By now, there must have been 500 cars lined up outside on the street. A very brief safety meeting was held, jobs were assigned, and it was time to open the gate.

Enclosed as an attachment is a rough schematic of how the final set-up looked.

START YOUR ENGINES

As the cars started to race around the queuing lanes, all I could think about was the Indy 500. Our contractor was unloading roughly 12 cars a minute. While the initial wait for people to drop off their waste was about 45 minutes, by about 11:00 the wait had decreased to about 20 minutes. By 12:30, I asked what the count was. When I was told that we had just broken LA City's record of 2,450 cars, my immediate reaction was one of disbelief. After all, we still had 2½ hours of collection left. By the time we finally closed the gate at 3:00, 4,202 cars had dropped off waste.

There wasn't much else to say about the actual collection. Once the lanes were set up, the ball was in the contractor's court. Aside from traffic control, and handing out questionnaires we just stood back and watched in amazement. Before long, it was time to close the gate. Our basic policy regarding closing the event is to take waste from the last car in line at 3:00 pm. As is always the case, we were forced to turn some people away after 3:00 pm. Fortunately, we had a few other roundups scheduled to give these people information on.

*****ROSEBOWL HHW ROUNDUP - SAT., APRIL 28, 1990*****

MATERIALS RECEIVED	DISPOSAL METHOD	LAB PACKS	BULK DRUMS	POUNDS	GALLONS
I. PAINT AND PAINT RELATED MATERIALS					
a. Waste Paint (latex based)	recycled				6,200
b. Waste Paint (latex based)	fuels program		28		1,400
c. Waste Paint (solvent based)	fuels program		100		5,000
d. Waste Paint (mixed)	landfilled	273		92,575	
e. Waste Paint Related Solids	landfilled		143	49,600	
II. SOLVENTS					
a. Solvents (high BTU)	fuels program		21		1,050
b. Solvents (low BTU)	fuels program		23		1,100
c. Solvents (poisonous liquid)	landfilled	15		4,925	
III. CORROSIVE					
a. Organic Acid	landfilled	1		325	
b. Inorganic Acid	landfilled	16		4,650	
c. Alkaline Liquid	landfilled	16		5,200	
d. Picric Acid	destructive incineration	3		15	
IV. COMPRESSED GAS					
a. Flammable	destructive incineration	42		8,100	
b. Non-Flammable	destructive incineration	11		2,080	
V. POISONS					
a. Liquid (non-reactive)	landfilled	69		22,425	
b. Liquid insecticides (non-flammable)	landfilled	23		7,975	
c. Liquid insecticides (flammable)	landfilled	20		7,700	
d. Liquid insecticides (reactive)	landfilled	5		1,725	
e. Solid Insecticides (non-flammable)	landfilled	32		9,950	
VI. USED MOTOR OIL					
a. Non-Contaminated	recycled				4,635
B. Contaminated	recycled				840
VII. MISCELLANEOUS WASTE					
a. Asbestos	landfilled		11	3,575	
b. Miscellaneous Waste (solids)	landfilled	101		32,325	
c. Oxidizers (solids)	treatment	3		900	
d. Oxidizers (liquids)	destructive incineration	2			10
e. Water Reactive Solids	destructive incineration	1			5
f. Waste Reactive Solid Metals	destructive incineration	1			5
g. Antifreeze	treatment		1		50
h. Used Car Batteries	recycled 550 batteries				
TOTALS		634	327	254,045	20,295

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WRAP-UP AND CONCLUSIONS

We were very lucky to have been able to set up on time, and as a result learned some very important lessons. The next week, in Long Beach at the next scheduled roundup. I was going to get a chance to test what I had learned. The Long Beach roundup ran without a hitch and attracted slightly more than 3,100 people. A few weeks later we conducted two more roundups that each attracted around 2,000 cars. Most recently, on October the 20th we ran our last roundup in 1990 and attracted about 1,200 cars. Some may interpret this consistent decrease in participation as a growing lack of interest on a part of the residents. I believe, however, that demographics play the largest role. Through our questionnaires, we have found that the majority of the customers come from within five miles of the roundup site. It is rare to see many people arrive from beyond that radius. As mentioned before, the questionnaires also revealed that in general the higher and middle income areas participate more in these type of programs. The lower income areas for any number of reasons do not participate as actively as other groups. More education programs are probably necessary on our part. I have found that a good way to estimate the target population, and subsequent participation rate is to draw a 5 to 7 mile radius circle around the roundup site. From this, one can see the neighborhoods you are trying to serve, and with the help of census figures, estimate a population.

Because of the unusually large attendance at the Rose Bowl, we managed to collect more waste than we expected. For this reason, it took our contractor roughly a week to package all the waste and arrange for proper transport and disposal. Such a scenario could have been a problem if we were at a site that required the parking area Monday morning. As it turns out, there were no other major events that week at the Rose Bowl, and the fact that the contractor was there all week was more of an inconvenience than anything else. I have attached a breakdown of the materials that we collected that day, which also illustrates the disposal method used by our contractor.

The Rose Bowl roundup ended up costing us (if you include both contractor/disposal costs, and County and District costs) about $500,000. This worked out to about $120.00 per vehicle served. Overall the average cost per vehicle for all the roundups we conducted worked out to be about $150.00 per vehicle. The roundups were financed through our Solid Waste Trust Funds, which are generated through land fill tipping fees. We hope to receive partial reimbursement from the State of California's Integrated Solid Waste Management Board through grants that have been set aside for cities and counties who have conducted these kind of programs.

Future one-day roundups will be conducted in 1991, and ultimately it is the County's plan to develop some sort of permanent program to provide LA County residents with a continuous way to get rid of their unwanted household hazardous wastes. Whether this permanent program will include permanent sites, a mobile facility, an ongoing series of one day roundups, or any combination of the above remains to be seen.

Currently, I receive between 10 and 15 phone calls per day from residents requesting a way to dump unwanted household items, and one can sense the frustration in their voices when they learn they are in between roundups, and that a place to bring their material just does not exist. While the periodic one-day roundup may only be a band-aid until a permanent program can be started, they are all the County has to offer right now. Fortunately, they are very well received, which strengthens the argument for establishing a permanent program.

In conclusion, I would like to reiterate the three most important elements that we found necessary to conduct a successful large household hazardous waste roundup. They are: one, know your contractor, two, know the demographics of your target area, and three, have adequate space and personnel to handle the expected crowd.

AMNESTY DAYS

By Jan Kleman
Hazardous Waste Reduction and Management Section
Florida Department of Environmental Regulation

Florida is an environmentally sensitive peninsula, extremely vulnerable to groundwater pollution. Mismanagement of hazardous waste, even from households, poses a real threat to our drinking water. This vulnerability necessitated action, beginning with the passage of Florida's 1983 Water Quality Assurance Act, which has given Florida excellent groundwater protection programs.

The original 12 components of the Water Quality Assurance Act, and hazardous waste management programs created since, are funded by Florida's Water Quality Assurance Trust Fund. This fund is replenished by the interest it generates and by revenue created from a tax on a select group of pollutants, such as petroleum products, lead-acid batteries, and solvents that have been identified as primary sources of groundwater contamination in Florida.

The most well-known program created under Florida's Water Quality Assurance Act was Amnesty Days. This state-funded and state-administered mobile hazardous waste collection program was initiated to accomplish the objectives of:

- purging Florida of small amounts of hazardous waste in storage;
- educating citizens on what hazardous waste is and how it can safely and properly be managed; and
- gaining public acceptance for permanent local collection centers.

Homeowners, farmers, schools, government agencies, and conditionally exempt small quantity generators can bring up to 100 pounds of hazardous waste to collections, free of charge, no questions asked . . . hence the name Amnesty Days. However, participants are encouraged to fill out a brief questionnaire.

The original Amnesty Days collection began in 1984. It ran 3 1/2 years, providing each of Florida's 67 counties with a minimum of 1 free collection day. Over 12,000 participants brought in over 1.5 million pounds of hazardous waste without incident. The total cost was $2.8 million.

During the collections, a licensed, insured hazardous waste management company is on site. Its trained professionals actually collect the waste and prepare it for transportation to recycling, treatment, or disposal facilities. The State becomes the generator of this waste and its EPA ID number is used when manifesting the waste. A county is expected to assist with its Amnesty Days by helping the State in selecting a location for the mobile collection and by advertising the event. The county is also required to take possession of, and properly manage used motor oil, lead-acid batteries, and latex paint.

Amnesty Days was originally intended to be a one-time only opportunity for a free, state-funded hazardous waste collection per county. The program was never intended to be the ultimate solution to Florida's hazardous waste management problems, but rather, a means for gaining public acceptance for locally sponsored ongoing hazardous waste management programs.

A major step toward establishing a network of permanent hazardous waste collection centers at the local level was realized when the 1985 Florida Legislature created the Hazardous Waste Collection Center Grant Program. The program provided up to $50,000 per county for capital outlay costs associated with construction of one or more permanent, safe, and secure hazardous waste collection centers. Local governments participating in the grant program were required to operate their centers for at least 2 years, offering a minimum of 2 well-advertised collection opportunities per year, free to households and at a reduced fee for conditionally exempt small quantity generators.

The collection center grant was available for 2 years before any counties showed interest. $50,000 was just not enough incentive. Also, counties were concerned about local acceptance of permanent facilities and adequate funding to pay for their required collections. However, in 1987, 7 counties did request the grant and successfully established local hazardous waste collection centers.

Still, the grant program wasn't moving fast enough. Additional steps needed to be taken to promote more county interest in fulfilling the legislative intent of establishing local responsibility for local hazardous waste management. In 1988 (also in 1989 and 1990), our legislature again took action.

- First, Amnesty Days was reauthorized for one more 3-year sweep through the State. This second and final $6,000,000 state-funded collection program will end this spring with anticipated participation and collection results tripling that of the initial program.

- Second, funding for the Hazardous Waste Collection Center Grant Program was appropriated for 3 more years. The grant limit per county was doubled to a maximum of $100,000. We anticipate an additional $1,000,000 appropriation during our 1991 legislative session.

- Third, counties with operational hazardous waste collection centers were provided the opportunity to forgo their second State Amnesty Days collection. Instead, they could request the funding designated for their state-sponsored Amnesty Days and use it to reimburse their own locally-sponsored hazardous waste collection program.

Also, the grant program has been expanded to include the Cooperative Collection Center Arrangement Grant which provides a collection opportunity for the smaller county that cannot afford to fund a full-time collection center. Under this program, a host county with an operational hazardous waste collection center enters into an agreement with a smaller, neighboring

county. The experienced host county assists its neighbor with a collection and both counties can receive grant assistance from the state -- the neighboring county gets reimbursed for 75% of the collection cost up to $25,000 and the host county gets $10,000. The Cooperative Collection Center Arrangement Grant offers a smaller county a bridge between its state Amnesty Days and establishing its permanent collection center.

In summary, the State's efforts in sponsoring local mobile hazardous waste collections, along with incentives for locally-sponsored permanent hazardous waste management programs, have proven very worthwhile. Amnesty Days, through its educational efforts and by providing counties with their first local collection experiences, set the groundwork. The Hazardous Waste Collection Center Grant Program has really taken off with nearly half of Florida's counties participating. The grant program offers permanent locations for ongoing hazardous waste collection opportunities and has laid the groundwork for a statewide collection center network.

We're very proud of the positive steps Florida has taken in local hazardous waste management and I'm pleased to have had the opportunity to share some of them with you. I have legislation and information on both the grant program and Amnesty Days that will be available to you after this session. Also, an Amnesty Days video can be borrowed from the Florida DER.

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- For longer-term storage, store in a cool, dry place. Many chemicals, especially those in cardboard packaging, can absorb moisture.

How can I get more details on what is hazardous and information on collection points in my area?

The Department of Environmental Regulation has a toll free number — 1-800-342-0184 — in operation during regular business hours, Monday through Friday, or you can write the department at "Amnesty Days," 2600 Blair Stone Road, Tallahassee, Florida, 32399-2400. If you would like to call the toll free line after hours, you may leave a message and your call will be returned.

Amnesty Days is not the ultimate solution to Florida's hazardous materials collection and disposal problems. It is one tool for assessing the long-term needs for safe and proper management of hazardous materials in the state.

The quality of our drinking water and natural resources tomorrow depends on each of us making the commitment toward a clean environment.

How can I better manage my waste?

Do's

- ✔ Keep wastes separated from each other.
- ✔ Follow directions on the label, including recommended methods of disposal.
- ✔ Avoid contact with skin and eyes.
- ✔ Keep children and pets away from hazardous materials.
- ✔ Store chemicals in a dry place. Many chemicals, particularly those packaged in cardboard containers, absorbe moisture.
- ✔ Take used motor oil to a local auto service center for recycling.
- ✔ Purchase alternative household cleaning products which are not toxic.
- ✔ Reduce your waste and save money by purchasing only materials you need and will use.
- ✔ Businesses should consider waste exchanges.
- ✔ Talk to local officials about the lack of proper disposal options for homeowners.

Don'ts

- X **Do not mix hazardous materials together!**
- X Do not flush waste down the toilet.
- X Do not pour waste down household drains.
- X Do not bury waste in yard.
- X Do not pour waste down storm drains.
- X Do not throw away waste in garbage – it will end up in a landfill where it can enter the groundwater and contaminate drinking water supplies.

When will Amnesty Days be coming to my area?

The map below gives the general schedule for when Amnesty Days will be coming to your area. Specific dates will be established, and widely publicized prior to collections.

Regional Planning Districts 9, 10, 11
from Jan through June 1989

Regional Planning Districts 5, 6, 7, 8
from July 1989 through June 1990

Regional Planning Districts 1, 2, 3, 4
from July 1990 through June 1991

Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

This public document was promulgated at an annual cost of $3,340 or $0.0022 per copy to inform the public about "Amnesty Days."

Amnesty Days

. . . for the proper disposal of hazardous waste

How you can get involve

Solvents, oil base paints, garden pesticides and chemicals can pollute the state's underground water resources if disposed of improperly. More than 92 percent of Florida's drinking water is ground water. Burying used oil in backyards and pouring solvents into storm drains or sinks are examples of improper disposal which are causing a chronic ground water pollution problem.

Because of these threats to drinking water supplies, the Florida Legislature in 1983 authorized the Department of Environmental Regulation — the state pollution control agency which regulates hazardous waste and protects Florida's ground water — to conduct a program in which the public, schools, farmers and small businesses could have small amounts of hazardous wastes disposed of properly at no charge. "Amnesty Days" will do that, and more.

FOR HOUSEHOLDS

How does Amnesty Days work?

Collection points for hazardous materials will be established in your area. The materials will be collected by a qualified waste management contractor and disposed of properly.

Why is proper disposal important– why can't I bury the waste, pour it down the drain, or throw it in the trash?

Proper disposal prevents pollution of the state's sensitive environment, which is highly susceptible to ground water contamination. Large amounts of rainfall in a temperate to subtropical climate, flat terrain, porous, sandy soils, and a high ground water table easily allow wastes to sink into underground water supplies.

Improper disposal - such as burying the waste - presents the potential for toxic substances to reach drinking water supplies. Studies have shown that in many areas of the state disposal of waste into the ground is synonymous with disposal into the drinking water supply. Individual acts of contamination such as a single can of paint poured in a single backyard, when multiplied thousands of times over, pose a great threat to the water supply. In many areas of the state the water table is five feet below the land surface.

Pouring waste down household drains allows the material to get into septic tanks or sewage treatment plants and eventually into ground water. Sewage treatment plants often cannot filter out hazardous materials.

Hazardous material in household trash is taken to landfills which can allow for great concentrations of toxics to reach ground water.

What is the purpose of Amnesty Days?

- To make the public aware of what hazardous materials are.
- To give citizens a way to dispose of hazardous materials.
- To purge surplus or unwanted chemicals from school laboratories.
- To assist in developing future hazardous materials management strategies.
- To inform the public that hazardous materials can be managed safely with minimal inconvenience.

What are hazardous materials, and do I have any in my home?

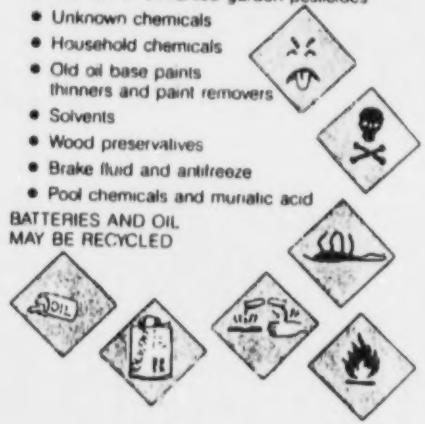
Hazardous materials include corrosive, reactive, ignitable and toxic materials that can present a threat to public health and safety, and the environment.

You probably have some in your home — on shelves in your garage, in the cabinets, and in work and storage sheds.

Following is a list of commonly used household materials which will be accepted at Amnesty Days collection points.

- Banned or unwanted garden pesticides
- Unknown chemicals
- Household chemicals
- Old oil base paints thinners and paint removers
- Solvents
- Wood preservatives
- Brake fluid and antifreeze
- Pool chemicals and muriatic acid

BATTERIES AND OIL MAY BE RECYCLED



What types of materials cannot be accepted at Amnesty Days?

- Biologically active materials
- Radioactive materials
- Gas cylinders
- Explosives and ordnance materials

What is my limit for free disposal?

You may dispose of up to **One Hundred Pounds** for free.*

Final determination of One Hundred Pounds will be made by the D.E.R. representative on site.

*FLORIDA RESIDENTS ONLY

Residency confirmation may be requested.

Georgia residents may participate in the cooperative service program described below.

COOPERATIVE SERVICE PROGRAM

The participant pays for disposal of additional drums.

You may dispose of four drums at a reduced rate.

For more information call 1-800-342-0184.

How should I prepare my waste for transport to an Amnesty Days collection site?

- Label the material. Every effort should be made to identify material. If you do not know what it is, mark it "unknown."
- Check all containers - make sure lids are tight.
- If containers are leaking, pack in a larger container and use an absorbent material such as cat litter to soak up leaks. For example - place a one quart container in a clean one gallon paint can available at local paint stores and surround with absorbent material.
- Boxes with dividers make good packaging.
- **Don't mix different or unknown materials together!**

403.7264 Amnesty days for purging small quantities of hazardous wastes.—Amnesty days are authorized by the state for the purpose of purging small quantities of hazardous waste, free of charge, from the possession of homeowners, farmers, schools, state agencies, and small businesses. These entities have no appropriate economically feasible mechanism for disposing of their hazardous wastes at the present time. In order to raise public awareness on this issue, provide an educational process, accommodate those entities which have a need to dispose of small quantities of hazardous waste, and preserve the waters of the state, amnesty days shall be carried out in the following manner:

(1)(a) The Department of Environmental Regulation shall administer and supervise amnesty days and shall contract with a department-approved, bonded waste handling company for implementation. The waste collected from the entities named in this section shall be transported out of the state for proper disposal at a federally approved facility.

(b) If a local government has established a local or regional hazardous waste collection center pursuant to s. 403.7265(4) and such center is in operation, the department and the local government may enter into a contract whereby the local government shall administer and supervise amnesty days. If a contract is entered into, the department shall provide to the local government, from funds appropriated to the department for amnesty days, an amount of money as determined by the department that is equal to the amount of money that would have been spent by the department to administer and supervise amnesty days in the local government's area. A local government that wishes to administer and supervise amnesty days shall notify the department at least 30 days prior to the beginning of the state fiscal year during which the amnesty days are scheduled to be held in the local government's area. Local governments that wish to administer and supervise amnesty days during fiscal year 1988-1989 shall notify the department no later than July 30, 1988.

(2) The department shall establish maximum amounts of hazardous waste to be accepted from any one entity during amnesty days. Amnesty days shall continue, at no cost to participants reporting with less than 100 pounds of hazardous waste, until funds appropriated by the Legislature for this purpose have been exhausted.

(3) Local governments are required to participate in the program by selecting a highly visible site for amnesty days, publicizing the event, and sending a representative to work at amnesty days activities when they occur.

(4) Regional planning councils shall assist the department in site selection, public awareness, and program coordination. However, the department shall retain full responsibility for the state amnesty days program.

(5) The state shall conduct amnesty days according to the following schedule:

(a) In counties within the geographic areas of the South Florida, Treasure Coast, and Southwest Florida Regional Planning Councils, amnesty days shall be held between January 1, 1989, and June 30, 1989.

(b) In counties within the geographic areas of the Withlacoochee, East Central Florida, Central Florida, and Tampa Bay Regional Planning Councils and in Volusia County, amnesty days shall be held between July 1, 1989, and June 30, 1990.

(c) In counties within the geographic areas of the West Florida, Apalachee, North Central Florida, and Northeast Florida Regional Planning Councils and in Jefferson County, amnesty days shall be held between July 1, 1990, and June 30, 1991.

(6) Amnesty days shall be funded on a continuing basis, as needed, from the Water Quality Assurance Trust Fund. The department is authorized to use up to 5 percent of the funds appropriated for amnesty days for administrative costs and up to 5 percent of such funds for public education related to amnesty days.

History.—s. 34, ch. 83-310; s. 37, ch. 84-338; s. 39, ch. 86-186; s. 7, ch. 88-393.

403.7265 Local hazardous waste collection program.—

(1) The Legislature recognizes the need for local hazardous waste collection centers throughout the state which can be operated to augment existing and future hazardous waste storage facilities. Local collection centers are to serve a purpose similar to the collection locations used in the amnesty days program described in s. 403.7264. Such collection centers are to be operated to provide a service to homeowners, farmers, and small businesses who generate small quantities of hazardous waste and to encourage proper hazardous waste disposal. Local collection centers will allow local governments the opportunity to provide a location for collection and temporary storage of small quantities of hazardous waste. A private concern should be responsible for collecting the waste within 90 days for transfer to a permitted recycling, storage, disposal, or treatment facility. In time, local collection centers are to become privately operated businesses in order to reduce the burden of hazardous waste collection on local government.

(2) The department, in cooperation with the regional planning councils and the counties, shall formulate and update a plan for collecting small quantities of hazardous waste from homeowners, farmers, and businesses in the state. The plan shall include:

(a) An assessment of private industry interest or involvement in hazardous waste collection in the state and recommendations to the Legislature for private industry collection incentives;

(b) A survey of businesses available to serve this function or alternative recycling or disposal functions with recommendations of approved firms to be used by local governments for the collection program;

(c) A method for encouraging private industry hazardous waste collection pilot projects in local and regional communities; and

(d) An assessment of the suitability of those areas designated by the regional planning councils as regional storage facility sites and a recommendation of a site for a multipurpose hazardous waste facility. The assessments and recommendation required by this paragraph shall be submitted to the Governor, the President of the Senate, and the Speaker of the House of Representatives no later than May 1, 1988.

(3) By March 1, 1991, the department shall develop a statewide local hazardous waste management plan which will ensure comprehensive collection and proper management of hazardous waste from small quantity generators and household hazardous waste in Florida. The plan shall address, at a minimum, a network of local collection centers, transfer stations, and expanded hazardous waste collection route services. The plan shall assess the need for additional compliance verification inspections, enforcement, and penalties. The plan shall include a strategy, timetable, and budget for implementation.

(4) For the purposes of this section, the phrase:

(a) "Collection center" means a secured site approved by the department to be used as a base for a hazardous waste collection facility.

(b) "Regional collection center" means a facility permitted by the department for the storage of hazardous wastes.

(5) The department shall establish a grant program for local governments which desire to provide a local or regional hazardous waste collection center. Grants shall be authorized to cover collection center costs associated with capital outlay for preparing a facility or site to safely serve as a collection center and to cover costs of administration, public awareness, and local amnesty days programs. The total cost for administration and public awareness shall not exceed 10 percent of the grant award. Grants shall be available on a competitive basis to local governments which:

(a) Comply with the provisions of ss. 403.7225 and 403.7264;

(b) Design a collection center which is approved by the department; and

(c) Provide up to 33 percent of the capital outlay money needed for the facility as matching money.

(6) The maximum amount of a grant for any local government participating in the development of a collection center shall be $100,000. If a regional collection facility is designed, each participating county shall be eligible for up to $100,000.

History.—s. 9, ch. 85-269; s. 40, ch. 86-186; s. 13, ch. 87-374; s. 8, ch. 88-393.

CHAPTER 17-735
HAZARDOUS WASTE COLLECTION CENTER GRANT PROGRAM

17-735.002 Application of Rule.(Repealed)
17-735.100 Intent.
17-735.200 Definitions.
17-735.300 General; Grant Limits.
17-735.400 Grant Eligibility.
17-735.500 Collection Center Grant Standards.
17-735.600 Cooperative Collection Center Arrangement Grant Standards.
17-735.700 Award of Grant Funds.

17-735.002 Application of Rule.
Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 1-6-86, Amended 10-12-86, 11-30-88, formerly 17-35.002, Repealed: 1-29-90.

17-735.100 Intent.
(1) The intent of this rule is to set forth the eligibility criteria for the allocation of grant funds to local governments for the construction and operation of local or regional hazardous waste collection centers or cooperative collection center arrangements. Once operational collection centers are funded, grant funds may be available for local amnesty day programs. These collection center grants will allow local governments the opportunity to provide locations for the collection and removal of hazardous waste.
(2) This rule shall apply to the Florida Department of Environmental Regulation and to local governments that apply for, or receive funds for the construction and operation of hazardous waste collection centers and for the operation of cooperative collection center arrangements.
Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 1-5-86, Amended 10-12-86, 11-30-88, Formerly 17-35.001, Formerly 17-735.001, Amended 2-11-90.

17-735.200 Definitions.
(1) "Administrative costs" means those costs directly associated with the operation of a collection center. This includes any public awareness costs.
(2) "Amnesty day programs" means those hazardous waste collection efforts administered by local governments in a manner similar to that conducted by the Department under the provisions of Section 403.7264, F.S.

(3) "Capital outlay costs" means those costs associated with construction of a collection center. The costs may include, but are not limited to, the cost of material and labor associated with new construction or renovation of existing structures. Land acquisitions and work done prior to the effective date of the grant award are not eligible for grant funding.
(4) "Cooperative collection center arrangement" means a host local government with an established and operational collection center, assisting a neighboring county through an interlocal agreement in providing one or more mobile hazardous waste collections per year in the neighboring county.
(5) "Department" means the Department of Environmental Regulation.
(6) "Local collection center" means a secured site to be used as a base for a hazardous waste collection facility. The collection center is used as a place to consolidate wastes prior to shipment to a permitted hazardous waste facility.
(7) "Local government" means any municipality, county, district, or authority, or any agency thereof, or a combination of two or more of the foregoing, acting jointly in connection with a project, which have jurisdiction over the collection, transportation, treatment, or disposal of sewage, industrial wastes, and other wastes.
(8) "Regional collection center" means a facility permitted by the Department for storage of hazardous wastes.
Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 1-5-86, Amended 10-12-86, 11-30-88, Formerly 17-35.003, Formerly 17-735.003, Amended 2-11-90.

17-735.300 General; Grant Limits.
(1) The primary purpose of funds from this grant program shall be to cover collection center costs associated with capital outlay for preparing a facility or site to safely serve as a local or regional collection center. Once an operational collection center is funded, grant funds may be made available for cooperative collection center arrangements and for local amnesty day programs.
(2) The total cost for administration and public awareness shall not exceed 10 percent of the grant award.
(3) Funds from this program shall be available to local governments.
(4) All local governments within one county may apply for grants. The total grant amount for the development of an operational collection center shall not exceed $100,000 per county. Cooperative collection center arrangement grants are in addition to any collection center grant and are not applied to the collection center grant limits.
(5) If a regional collection center is proposed, each participating local government shall be eligible to apply for up to $100,000.

(6) In a cooperative collection center arrangement, the maximum annual grant a participating host local government can receive is $10,000. This amount is to be used to defray costs associated with assisting the neighboring county and for the host local government's hazardous waste collection center program. The maximum annual reimbursement grant a neighboring county can receive is 75% of its collection day program expense to a maximum annual amount of $25,000. A host local government may enter into a cooperative collection center arrangement with more than one neighboring county.

(7) The collection centers shall be operated to provide a service to households, farmers, and small businesses that generate hazardous waste and to encourage proper hazardous waste disposal.

Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 1-5-88, Amended 10-12-88, 11-30-88, Formerly 17-35.004, Formerly 17-735.004, Amended 2-11-90.

17-735.400 Grant Eligibility.

(1) Grant funds shall be made available on a competitive basis to local governments. If grant requests exceed available funding, the Secretary of the Department will award available grants based on evaluation of the information submitted in subsections (3) and (4).

(2) Applicants are to consult and discuss the need for collection centers and proposed operational plans with the Department prior to submitting a final grant request. This discussion should be held as early as possible in the planning process.

(3) Applicants shall provide to the Department:

(a) Collection center design plans and specifications including the actual site location(s) approved by the local government.

(b) Ownership and operational plans that include assurance of compliance with Chapter 17-730, F.A.C., concerning hazardous waste management.

(c) Availability of local government funding which will provide for continued operation of the center.

(d) Assurances of compliance with Section 403.7225, F.S., concerning local hazardous waste management assessments; Section 403.7234, F.S., concerning small quantity generator notification and verification; and Section 403.7294, F.S., concerning amnesty days.

(e) A budget which includes project cost estimates, assurances of availability of construction and operation funds and the grant amount being requested including the amount of local government funding for the match for capital outlay.

(f) Assurances that all applicable state and local notifications and permits have been applied for.

(g) A time schedule for construction and assurances of continued operation of the collection center for at least two years from completion.

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(4) Priority will be given first to applicants requesting funding for construction of hazardous waste collection centers in counties where such permanent facilities do not exist and then to applicants requesting funding in order to operate host collection centers under a cooperative collection center arrangement for assisting neighboring counties which do not have established local hazardous waste collection centers.

Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 1-5-88, Amended 10-12-88, 11-30-88, Formerly 17-35.005, Formerly 17-735.005, Amended 2-11-90.

17-735.500 Collection Center Grant Standards.

(1) Regional collection centers must obtain hazardous waste permits in accordance with Chapter 17-730, F.A.C..

(2) Chapter 17-730 contains standards which would require a hazardous waste permit for a local collection center under certain circumstances. The Department should be consulted in determining whether or not a permit is required.

(3) The local government is responsible for entering into a contract(s) with a licensed, insured private company that will be responsible for collecting hazardous wastes and assuring the delivery of these wastes to a permitted recycling, storage, disposal or treatment facility.

(4) The local government is responsible for guaranteeing operation of the collection center for two (2) years after the facility is open for operation, including at least two (2) days per year when household hazardous waste will be accepted at no charge to non-business entities. These "free collection days" will be well advertised to encourage participation.

(5) The local government is responsible for offering at least two (2) days per year when conditionally exempt small quantity generators can bring their hazardous wastes to the collection center in order to obtain a reduced fee for proper disposal of their hazardous wastes at a permitted facility.

(6) The local government is responsible for working with its contractor to advertise, establish, promote and expand hazardous waste collection route services, such as a "milk run", to regulated small quantity hazardous waste generators in order to obtain a reduced fee for proper disposal of their hazardous wastes at a permitted facility.

(7) All hazardous waste generators should be notified of the opportunities outlined in subsections (5) and (6) by the local government or the contractor through a direct mailout or by advertisement in the local media, as appropriate.

(8) Collection centers constructed with grant funds shall keep records of the types and amounts of waste received and the final destination of such wastes. A summary report shall be prepared and submitted to the Department by March 1 of each year, covering the previous calendar year.

Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 1-5-86, Amended 10-12-86, 11-30-88, Formerly 17-35.006, Formerly 17-735.006, Amended 2-11-90.

17-735.600 Cooperative Collection Center Arrangement Grant Standards.

(1) The host local government must have an established and operational hazardous waste collection center and must have a licensed, insured private company under contract that will be responsible for collecting hazardous wastes and assuring the delivery of those wastes to an approved recycling, storage, disposal or treatment facility.

(2) The host local government and the neighboring county government must enter into a written interlocal agreement to meet the following requirements, and then jointly apply for the cooperative collection center arrangement grant.

(3) A host local government shall:

(a) Work with the neighboring county government to establish a site in the neighboring county for a mobile hazardous waste collection. The hazardous waste collection will be free to neighboring county households and will be offered at a reduced fee to conditionally exempt small quantity generators for the collection and proper management of their wastes at a permitted facility.

(b) Help publicize the upcoming neighboring county collection by providing the media in the host county with collection information.

(c) Be on site during the neighoring county collection.

(d) Collect from the neighboring county 25% of the total cost of the hazardous waste collection and any additional funds necessary to equal the costs of the collection which exceed the sum of the 25% payment identified in this paragraph and the $25,000 maximum reimbursement grant.

(e) Pay its contractor for the neighboring county's collection.

(4) The host local government may, upon completion of the neighboring county's hazardous waste collection, request payment of the $10,000 grant for acting as the host local government under a cooperative collection center arrangement and submit an invoice to the Department for reimbursement of the neighboring county's collection, not to exceed $25,000.

(5) The neighboring county shall:

(a) Establish a site for its mobile hazardous waste collection.

(b) Guarantee funding for payment of 25% of its collection cost to the host local government.

(c) Provide funding for any additional collection costs which exceed the sum of the costs identified in paragraph 5(b) and the $25,000 maximum reimbursement grant, and pay the host local government within a time frame specified in the interlocal agreement.

(d) Establish a local project manager to work with the host government to prepare and distribute public awareness information on proper hazardous waste management and publicize the collection day. This information will be distributed to the local media, schools, agricultural agents, and civic and service organizations.

(e) Attend the collection and assist the host government in overseeing paperwork at the close of the collection.

(f) Provide the hazardous waste management company under contract to the host local government the names and addresses of regulated small quantity generators of hazardous waste in its county.

(g) Work with the host local government to advertise, promote and organize a "milk-run" collection route service for regulated small quantity generators in order to obtain a reduced fee for proper disposal of their hazardous wastes at a permitted facility.

Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 2-11-90.

17-735.700 Award of Grant Funds.

(1) Final grant requests must be submitted to the Department on or before October 15 of each state appropriation year.

(2) The Department shall notify applicants of approval or denial of their grant request within 60 days of October.

(3) If grant funds remain after the initial awards are made, additional grant requests will be evaluated and awarded on a competitive basis each month until grant funds are no longer available.

(4) Grant funds are not available to meet the costs associated with work done prior to the effective date of the grant award.

(5) Grant funds are subject to termination and refund if the approved grant request is substantially deviated from or the local collection center is not constructed in a manner to be operational within one year from the date of the grant award.

Specific Authority: 403.704(16), F.S.
Law Implemented: 403.7265, F.S.
History: New 1-5-86, Amended 10-12-86, 11-30-88, Formerly 17-35.007, Formerly 17-735.007, Amended 2-11-90.

FEDERAL LIABILITY ISSUES FOR HHW COLLECTION PROGRAMS

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The views expressed herein do not necessarily represent the official position of EPA

Introduction

- The principal Federal laws governing liability for household hazardous waste (HHW) are the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA).

- There are other laws and liability issues that will affect HHW collection programs, such as local siting regulations, compensation for workers' injuries, accidental spills, etc. As a matter of Federal environmental law, however, RCRA and CERCLA are the two laws of primary importance for municipal liability purposes.

The HHW Liability Problem

- All municipal wastes present a potential liability problem for municipalities because of the small percentage of hazardous constituents ordinarily contained in such wastes. While there is always a liability potential for these wastes no matter how disposed, there are steps that can be taken which will minimize that risk.

- The clear message of the structure of the Federal laws is that HHW collection programs, by diverting hazardous wastes out of the municipal waste stream (and away from CERCLA liability) and into RCRA-permitted facilities, are the best thing that can be done to minimize potential Federal liability.

- Under RCRA municipalities are basically exempt from liability for HHW, while under CERCLA municipalities are generally liable for their hazardous wastes. Therefore, by diverting the wastes into the RCRA system the potential for liability is diminished.

RCRA

- Under RCRA, wastes are classified as hazardous, in which case they must be disposed of in accordance with Subtitle C requirements for hazardous waste facilities, or classified as non-hazardous, in which case the less stringent disposal requirements of Subtitle D apply.

- Most importantly RCRA liability purposes, HHW is unconditionally exempt from the definition of hazardous wastes subject to the Subtitle C disposal requirements.

- HHW is exempted not because the wastes are not hazardous, but because the source of the wastes is households (which includes single and multi-family residences, hotels, campgrounds, etc.). For the exemption to apply, the wastes must be derived from these sources only. The same substances, if derived from commercial or other sources, are classified as hazardous wastes under RCRA.

- While RCRA does not require that the hazardous constituents be separated out of the municipal wastestream, not doing so is risky.

- The risk is presented by the potential for CERCLA liability where the HHW is disposed of in municipal landfills regulated under Subtitle D. The exclusion of HHW from the definition of hazardous wastes applies only to RCRA--it does not translate into an exclusion under CERCLA.[1] Under CERCLA, it is the hazardous character of the substance, and not its source, that is important. If the hazardous constituents of household wastes are not separated out from the municipal wastestream, the potential for CERCLA liability increases.

CERCLA

- Management and collection of HHW under RCRA can be a complex and sometimes expensive undertaking. However, if municipal wastes cause or contribute to an environmental problem, the potential for liability under CERCLA is far greater

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[1] In recent CERCLA litigation the RCRA exclusion has been argued to provide an exemption from CERCLA liability, but so far without success.

than under RCRA.

- Under CERCLA, if there is a problem, there are several key liability principles that mean a potentially large exposure for a municipality:
  - 1st: The principle of strict, joint and several liability for all costs of cleanup. Of the 1200-plus CERCLA sites on the National Priorities List for cleanup, about 25% are municipal landfills. The cost to remediate these landfills usually runs into the tens of millions of dollars.
  - 2d: Standard "reopeners" in CERCLA settlement agreements--which require additional work if the initial cleanup is insufficient--mean that a cloud of potential liability will remain even after court settlement.
  - 3rd: Under best circumstances, a municipality may be treated as a de minimis contributor of waste, or may be required to pay a proportionately smaller amount under an allocation scheme with other contributors of waste. However, because of the usually high costs to remediate municipal landfills, even a de minimis settlement can be expensive.
  - 4th: Under an EPA policy issued December 12, 1989 (Vol. 54 Federal Register, page 51071), EPA ordinarily does not prosecute municipalities under CERCLA where the only evidence of disposal by a municipality is of solid wastes. However, the EPA Policy does not affect contribution or third-party actions, and the number of such cases is increasing.
- If the hazardous component of municipal wastes are diverted into the RCRA wastestream, the potential for liability diminishes.

RCRA & HHW Collection Programs

- The liability issues for HHW collection programs center on how the waste is collected and packaged for disposal. In general, to minimize both the legal and environmental risks, it is recommended that HHW be handled in the same manner as any fully regulated RCRA Subtitle C waste.
- After this, the biggest liability challenge is to ensure that the waste being collected is in fact from households, and is of a

type and quantity expected to be used by households. The exclusion for HHW does not apply to wastes from small businesses or other small generators of hazardous wastes, because these wastes are not from households. These commercially-derived wastes are considered hazardous and are subject to the RCRA Subtitle C requirements.

- Once collected, to minimize legal and environmental threats it is recommended that HHW be disposed of in a properly permitted RCRA hazardous waste facility. Occasionally the RCRA facility accepting the HHW will want the collection program sponsor to sign the RCRA manifests showing the sponsor as the generator. This is not required by RCRA and the collection sponsor cannot legally be considered to have generated a RCRA hazardous waste because HHW exempted under RCRA. Therefore, it is permissible to sign the manifests when requested because doing so will not change the fact that HHW is an exempted waste, nor does it alter a sponsoring municipality's liability.

- Some more aggressive HHW collection programs accept hazardous wastes from small businesses, schools, and other entities that generate small quantities of hazardous wastes. "Small quantity generators" (SQGs) are defined as those that generate less than 100 kg/month (220 lbs/month). Wastes from SQGs are considered hazardous under RCRA, but if disposed of in a Subtitle C hazardous waste facility they are <u>conditionally</u> exempt from some of the RCRA permitting and manifesting requirements. It also means that if the HHW collection program is sending its wastes to a Subtitle C facility, it can also accept the SQG wastes.

- If both HHW and SQG wastes are collected, <u>they must not be mixed</u>. If mixed, a new waste is created, and both the unconditional exemption for HHW and the conditional exemption for SQG wastes do not apply. If mixed, the program sponsor may be considered to be a waste generator subject to some or all of the Subtitle C requirements, and fully liable on that basis.

<u>Limiting the Liability Potential</u>

- Under CERCLA, a municipality is largely without protection from liability for its disposal of hazardous substances. Under RCRA, in the case of a failure of the facility containing HHW and SQG

wastes, there are several protective layers insulating a municipality from liability.

- HHW collection programs divert hazardous wastes to a facility that is designed to handle such wastes. Consequently, it is unlikely that an environmental problem will be created in the first instance.

- If there is a facility failure and environmental harm, the owner or operator of the RCRA facility is primarily liable, and the RCRA structure is intended to ensure that the owner/operator is sufficiently well-funded to afford the necessary cleanup activities.

- Even if the RCRA owner/operator cannot undertake cleanup, the RCRA system has financial assurances built in to it so that closure funds should be available.

- Therefore, by diverting HHW from disposal in ordinary solid waste landfills and instead arranging for such wastes to be disposed of in a reputable RCRA Subtitle C facility, a municipality will minimize the potential liability it faces for HHW.

The Federal Hazardous Waste Regulations for Household Hazardous Waste Collection Programs

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U.S. Environmental Protection Agency

Household hazardous waste collection programs perform a valuable service in segregating potentially harmful materials from the rest of the municipal solid waste stream. In the actual collection program, municipal workers may encounter a number of situations where the federal hazardous waste regulations have a major impact on a particular waste's handling. This paper describes some of the precautions municipal program workers will want to take to reduce the number of problems they encounter.

The federal hazardous waste regulations contain an exemption for household wastes, found in Title 40 of the Code of Federal Regulations, Section 261.4(b)(1). This exemption allows individual citizens to discard a wide variety of materials into the municipal wastestream without concerning themselves with the federal hazardous waste regulations. However, as EPA has stated publicly in the past, the reason for having an exemption for these wastes is <u>not</u> because they pose no hazard. Rather, the exemption is based on Congressional interest that wastes generated by consumers in their households be exempt from federal hazardous waste regulations. Accordingly, handlers of household hazardous wastes do not need to comply with the federal hazardous waste regulations when managing household wastes.

In order for materials to be included in the federal household waste exemption, they must meet two criteria: they must be generated by individuals on the premises of a temporary or permanent residence for individuals; secondly, they must be composed primarily of materials found in the wastes generated by consumers in their homes.

In interpreting the first criterion above, EPA has written the regulations so that wastes generated at single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas are exempt (provided they also meet the second criterion). Wastes from establishments such as retail stores, office buildings, restaurants, and shopping centers are clearly not generated on the premises of a residence for individuals, and thus are not covered by the household waste exemption.

In interpreting the second criterion, EPA has stated that certain classes of wastes are not eligible for the exemption - for example, debris produced during building construction, renovation, or demolition. These wastes are not considered to be similar to those generated by a consumer in the home in the course of daily living.

Both the type of waste and the conditions of its generation are important to determine whether or not it qualifies for the federal household waste exemption. Examples of problems that could arise in a household hazardous waste collection program are:

- A citizen brings in fourteen gallons of unused insecticide. When questioned about its origin, he claims that it is excess insecticide from a previous owner of the house.

- A citizen brings in twelve gallons of used oil that he claims he has collected from changing the oil in his personal vehicle.

- A small business owner brings in unused paint; the business owner has used the paint on his business premises, which are attached to his house, but not on the premises of his residence.

In the first two examples, the household hazardous waste collection program staffers must exercise judgment to evaluate whether the waste is from a household, rather than a business. In the third example, the waste does not fall within the federal household waste exemption, and a much more comprehensive questioning of the small business owner would be needed to determine what the federal regulatory requirements are.

Thus, the load checking function that the collection program workers perform consists of two steps: classifying where the wastes are from (i.e., the premises of a residence) and then whether they are composed of materials normally generated by consumers in their homes. If the household hazardous waste collection program managers are intentionally limiting the collection program to household wastes only, then in the above examples, the small business owner's paint is rejected from the collection program, while the citizens' insecticide and used oil is accepted (assuming further questioning satisfies the collection program workers that the materials did indeed come from the citizens themselves and not from a business).

Household hazardous waste collection program managers who decide that they do want to accept wastes that are not eligible for the household waste exemption need to be familiar with the federal hazardous waste regulations, because mixing the household wastes with regulated hazardous wastes can, in some situations, greatly increase the quantities of wastes that must be managed as hazardous wastes, and can greatly reduce the available waste management options. A decision to include wastes that are not eligible for the household waste exemption may not only increase the number of regulatory requirements, but also changes the household waste collection program's status - because the wastes being handled are no longer "non-hazardous" under the federal regulatory scheme.

The federal hazardous waste regulations are set up so that wastes which are hazardous are regulated at different levels, depending on the quantities generated per month at the generator's site. In addition, mixing of certain hazardous wastes with non-regulated wastes will, under certain conditions, cause the entire

mixture to become regulated as hazardous waste. The same reasoning applies to household hazardous waste; if mixed with regulated hazardous wastes, then under certain conditions (described below) the entire mixture must be handled as hazardous waste.

The smallest hazardous waste generators are known as "conditionally exempt small quantity generators." These wastes come from generators of 100 kilograms (or less) per month (or less than 1 kilogram per month of acutely hazardous wastes).1/ These generators' hazardous wastes could be handled by a household hazardous waste collection program, as long as the program was permitted, licensed, or registered by the state to manage municipal waste.

The next category of hazardous waste generators are known as "100 to 1000 kg per month generators" because they generate between 100 and 1000 kilograms of hazardous waste per calendar month. These generators' hazardous wastes are subject to a broad range of regulatory controls; a municipality would have to become a hazardous waste transporter in order to legally accept these generators' hazardous wastes.

The third category of generators are the "large quantity generators" - those who generate 1000 kilograms or more of hazardous waste per month (or more than 1 kilogram of the acutely hazardous wastes). These generators have controls on their wastes' management that are similar to the controls for the 100-1000 kg/month generators, and in some cases their controls are more strict than the controls for 100-1000 kg/month generators. The same situation applies to these wastes that applies to hazardous wastes from 100-1000 kg/month generators: if a municipality decides to accept wastes from these generators, it must be a hazardous waste transporter in order to legally accept these wastes.

By way of an example situation that may arise during a household hazardous waste collection program, a small business owner like the generator of the excess paint may seek to have his paint collected at a household waste collection program. Assume the small business owner is a conditionally exempt small quantity generator. Household hazardous waste that is mixed with this generator's hazardous waste <u>at a location away from the conditionally exempt small quantity generator's site</u> is still subject to the conditionally exempt generator regulations, even if the mixture exceeds the quantity limits for conditionally exempt small quantity generators. (The quantity limits for conditionally exempt small quantity generators are set for the original generator of the waste, at the original generator's site.)

1/ Translated from weight to volume, 100 kilograms of hazardous wastes that have a density similar to water occupy about one-half of a 55-gallon drum. 100 kilograms of paints probably take up slightly less volume, while 100 kilograms of hydrocarbon liquids such as nonhalogenated solvents take up slightly more volume than one-half of a 55-gallon drum.

A second example is a small business owner who is a conditionally exempt small quantity generator; if he has mixed his hazardous waste with used oil, and is seeking to have it collected at a household waste collection program, then the collection program managers need to be aware that the used oil is subject to the 40 CFR Part 266, Subpart E regulations if it is destined to be burned for energy recovery.

A third example is a generator of 150 kilograms of F006 (a listed hazardous waste) per month. If this generator's hazardous waste is mixed with household waste, then the entire mixture becomes regulated hazardous waste; all handlers of those wastes must comply with the hazardous waste manifesting and land disposal restrictions regulations.

Because the federal hazardous waste regulations are quite complicated, a decision to accept wastes from businesses should be accompanied by a strategy that addresses the various scenarios that may arise. As previously stated, segregating the wastes is critical to keeping the range of available waste management options as open as possible.

Identifying Unknowns

Tom Watkins
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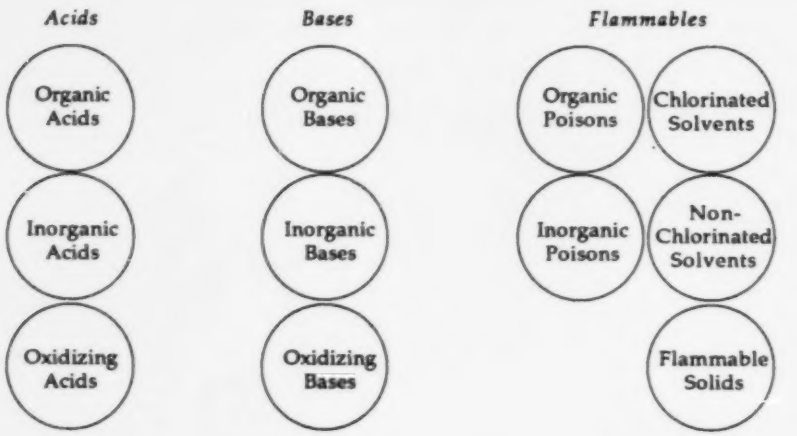
Introduction

At San Francisco's Household Hazardous Waste Collection Facility[1] (HHWCF), 1-2% of the containers brought in are of unknown chemical origin (i.e. wastes are not labelled or not in their original containers). Currently we receive about 20 unknowns each day we are open to the public. By necessity, we developed a system called the Waste Identification and Classification Test (WICT) for identifying these unknowns and classifying them according to their waste streams.

Figure 1 shows how the drums, representing 11 major waste streams for household hazardous wastes, are arranged within the bays in our facility. Drums are placed in the storage area of our facility according to their hazard class. There are three bays: the acid bay, base bay, and flammables bay. This illustration does not include all drums; there are a total of 24 waste streams, however these 11 drums account for 95% of our hazardous wastes.

Figure 1 Major Waste Streams



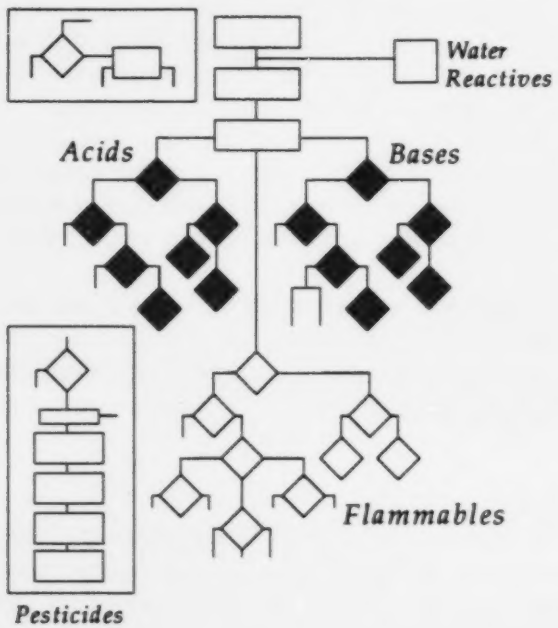
The goal of the WICT is to perform a complete analysis of unknown wastes and identify them using a series of a few wet chemistry tests, in order to place them into drums corresponding to a compatible waste stream.

[1] The SFHHWCF, a joint project of Sanitary Fill Company and the City and County of San Francisco, opened in November 1988. The facility receives household hazardous wastes from San Francisco residents only, and it is open 8 am-4 pm, Thursday, Friday, and Saturday. Participation has grown steadily since opening; currently the facility receives about 50 residents bringing 600-700 containers each day of operation.

Identifying Unknowns (cont.)

An important part of using this method is interpreting the results of the chemical tests with the aid of a flow chart with branching decision points. Endpoints on the chart represent waste streams and with each waste stream is associated a Department of Transportation (DOT) shipping name. The organization of the WICT chart, shown in Figure 2 below, is similar to grouping of the drums in the SFHHWCF.

Figure 2 General Organization of the WICT Chart



Compliance Criteria

The WICT was designed to comply with requirements from two regulatory agencies and the final disposal site. The agencies are the Environmental Protection Agency (EPA) and the Department of Transportation (DOT), and the disposal sites are Transfer, Storage, and Disposal Facilities (TSDFs).

EPA Criteria for the Definition of "Hazardous"

According to the EPA, a material is hazardous if it exhibits one or more of the following properties: toxicity, corrosivity, ignitibility, and reactivity. To comply with the EPA when classifying an unknown, the WICT is made up of tests for each of these properties.

Identifying Unknowns (cont.)

Toxicity is tested using two tests: the emulsification test and the heavy metal screening test. When an unknown emulsifies when added to water, it is probably a pesticide (organic poison). Heavy metals, such as mercury, lead, arsenic, and cadmium, are screened out by mixing the unknown with a solution of dithizone in chloroform. When a heavy metal is present at a parts-per-million level, dithizone will chelate with the metal causing a color change. Unknowns containing heavy metals are usually classified as inorganic poisons.

Corrosivity is a determination of whether or not a substance will react with organic or metallic materials. Using pH paper, this test screens out corrosive materials as either acids (pH 0-4) or bases (pH 10-14). In practice, most non-corrosive materials (pH 5-9) are flammables.

Ignitibility is determined by heating a small amount of the unknown in a test tube to see if it catches fire. We call this test the char test, because organic substances either catch fire or leave a black residue in the test tube. The black residue is carbon, therefore a positive char test indicates an organic (carbon based) material.

Reactivity is determined by three tests: The oxidizer test uses potassium iodide paper to determine if the unknown is an oxidizer, and the peroxide paper test identifies peroxides using commercially available peroxide paper. The emulsification test mentioned above indicates if the unknown is water reactive.

DOT Criteria for Shipping Labels

The WICT was also designed with Department of Transportation criteria in mind. The DOT is concerned with the safe transportation of hazardous materials and is particularly concerned about potential hazardous material spills on the nation's highways. In a spill situation, the driver of the vehicle and the emergency response crews need to know the identity and hazardous properties of all substances to ensure safety and expedite cleanup. DOT has strict labeling requirements for each different combination of the four hazardous properties of hazardous materials.

For example, a substance such as a pesticide has two of these properties: it is toxic and flammable. The DOT shipping name for an organic poison is as follows:

Waste Flammable Liquid, Poisonous, N.O.S., Flammable Liquid, UN 1992

This name indicates the substance's hazardous properties, namely, that it is toxic (poisonous) and ignitible (flammable). Most DOT names also indicate a substance's physical state, such as *liquid*, as in this case. Compatible hazardous wastes with each combination of properties constitute a different waste stream when we consider the DOT criteria for shipping labels.

Identifying Unknowns (cont.)

TSDF Criteria

The WICT was also designed with considerations for how specific waste streams are treated and/or disposed and their compatibilities, according to federal TSDF standards.

For example, the DOT would allow chlorinated and non-chlorinated solvents to be labpacked together and not labelled separately. However, the TSDF prefers that we keep them separate because of pricing and treatment; non-chlorinated solvents are more suitable for fuel blending than chlorinated solvents. Therefore, as part of the WICT, each solvent is tested for chlorine.

Another example of a waste stream that is separated because of TSDF requirements is oxidizing bases. Hypochlorite compounds are very reactive and in particular, react with ammonia compounds to produce a lethal gas. TSDF standards require that hypochlorites are stored separate from oxidizing bases containing ammonia. Therefore, as part of the WICT, each oxidizing base is tested for hypochlorites.

Examples

Consider the set of test results below in Figure 3.

Figure 3 Example Test Results for an Inorganic Acid

Test	*Result*	*Interpretation*
Emulsification	negative	not a pesticide
Heavy Metal Screening	negative	no poisonous metals
pH Paper	pH=0	acid
Char	negative	inorganic
Oxidizer Paper	negative	not an oxidizer
Peroxide Paper	negative	not a peroxide

When an unknown tested using the WICT system gives this set of test results, it is placed in the inorganic acid waste stream. As part of the WICT, an inorganic acid also undergoes a series of precipitation tests to determine the anion present (e.g. sulfate for sulfuric acid or phosphate for phosphoric acid).

Identifying Unknowns (cont.)

Consider the set of test results below in Figure 4.

Figure 4 Example Test Results for an Organic Acid

Test	*Result*	*Interpretation*
Emulsification	positive	may be a pesticide
Heavy Metal Screening	negative	no poisonous metals
pH Paper	pH=3	acid
Char	positive	organic
Oxidizer Paper	negative	not an oxidizer
Peroxide Paper	negative	not a peroxide

When an unknown tested using the WICT system gives this set of test results, it is placed in the organic acid waste stream. As part of the WICT, an organic acid with a positive emulsification test is a suspected pesticide and also undergoes a series of Dräger tube tests to determine the type of pesticide (i.e. hydrochloric acid Dräger tube for chlorinated pesticides, phosphoric acid ester Dräger tube for organophosphate pesticides, ammonia Dräger tube for ammonia-based pesticides, and acetaldehyde Dräger tube for aldehyde-based pesticides).

Summary

The WICT system meets the requirements for the EPA, DOT, and TSDFs. Each container is assigned a unique reference number, which is used for record keeping. Our technicians complete a form indicating the unique number as well as test results that provide a rationale for the waste stream determination, including chemical components. This form follows the container from "cradle-to-grave" (i.e. from when the waste is identified as a hazardous waste at our facility to its final treatment or disposal site).

The WICT can be used to classify unknown hazardous wastes into a compatible waste stream using a series of simple and quick wet chemistry tests. It usually takes a trained employee about 15 minutes to run the tests necessary to identify and classify an unknown. With the WICT, we have developed a cost-effective system for testing unknowns brought to the San Francisco Household Hazardous Waste Collection Facility. ■

PERMITTING REQUIREMENTS FOR HHW PROGRAMS: A COMPARISON OF SEVEN STATES

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Toxic Substances Control Program

Permitting requirements for household hazardous waste (HHW) facilities vary greatly from state to state. These variations are the basis for this presentation, i.e., a comparison of some of the permitting or plan approval requirements for several different states. The particular requirements focused on are:

1. Siting criteria or limits.
2. Storage requirements.
3. Training requirements.
4. Generator status.
5. State permit or approval required.

The seven states surveyed include: Connecticut, Massachusetts, Minnesota, New York, Vermont, Washington, and California.

Siting Criteria or Limits: Three states (Massachusetts, Washington and Vermont) have siting criteria.

Massachusetts - One-day Events:
50' setback
Impervious surface
No other activities at same site
Permanent Facilities:
Site approval is the first step of the approval process - the applicant must submit sufficient information to convince the State that the site chosen "will not cause a significant impact on public health, safety, the environment, or drinking water supplies."

Washington - One-day Events and Mobile Sites:
There is a site checklist that addresses such things as whether or not there are any environmentally sensitive areas nearby and whether any special precautions need to be taken.
Permanent Facilities:
Facilities must comply with all of the location standards for a solid waste facility, including: geology (no holocene faults, etc.); groundwater;

flooding; surface waters; slope; airports; critical habitats (for both threatened and endangered species); buffer zones (100' from the property line of a nonresidential property, 250' from the property line of a residential property, and 1000' from the boundary of all State and National Parks); and all sites must conform to all local land use plans, zones and ordinances.

Vermont - Facilities are sited like a solid waste transfer station and must conform to existing local Solid Waste Management District siting criteria. But there are areas where siting is prohibited, such as wetlands, wildlife refuges, critical habitats, etc.

Four states (Connecticut, Minnesota, New York and California) do not have siting criteria, although two of the four (Connecticut and Minnesota) provide "Guidance", and New York has "Recommendations" for siting. California, on the other hand, relies on the local jurisdictions (city and county) - since they conduct the programs - to determine appropriate sites, although our expectation is that good judgement will prevail and that all locations will conform to local codes and ordinances. In some cases, there may be siting criteria in local County Hazardous Waste Management Plans that apply.

Storage Requirements and Limits: In general, most states allow up to 90 days storage time at permanent facilities, although some local jurisdictions in Washington allow only 10 days maximum. This will change in the future, and become either 90 or 180 days statewide. Minnesota, on the other hand, will allow greater than 90 days storage with State approval. California currently allows the standard 90 days, but has proposed up to one year storage in our new Permit by Rule (PBR) regulations.

The greatest variation in storage requirements and limits appears to relate to the one-day collection events, with time limits varying from 24 hours in Massachusetts and Washington, three days in New York, and 144 hours (6 days) in California.

Training Requirements: In general, most states (five to be exact) require the 40 hour OSHA training - the exceptions being Connecticut and Washington. Connecticut does require a training plan and that all staff be trained, including volunteers handling the HHW; Washington requires safety training for all staff and all are required to be familiar with hazardous waste handling procedures.

Generator Status: This is one of the more interesting aspects because this varies significantly across the U.S. In three states (Connecticut, Washington and California), the generator is the local jurisdiction hosting or sponsoring the activities. In Connecticut, it's the contractor. In Massachusetts, it's the contractor for one-day events, but can be just about anyone for

the permanent facilities (organizer, sponsor, contractor, public works department, etc.). In Minnesota, 50% of the programs are operated by the State, so the State is the generator; in the remaining 50%, it's the program sponsor - usually the county. In New York, there is no generator for one-day events because HHW is considered to be solid waste; for permanent facilities, the generator is whoever fills in the "generator" blank on the manifest.

State Permit or Approval Required: We'll take these one by one.

Connecticut - One-Day Events: A letter of approval must be obtained from the State.
Permanent Facilities: 2 permits are required:
1 to construct
1 to operate

Massachusetts - One-Day Events: No permit or approval is required.
Permanent Facilities: Must obtain State approval, not a permit.

Minnesota - One-Day Events: No permit or approval is required, but the operator must notify the State and must comply with modified management requirements.
Permanent Facilities: Approval, not a permit, is required if storage will be greater than 90 days. Notification is more extensive than for one-day events. A permit is needed only if treatment or disposal will occur on-site.

New York - One-Day Events: State approval is required. The applicant must submit a plan to the State at least 60 days in advance and obtain written approval from the Department of Environmental Conservation.
Permanent Facilities: 2 permits are required:
1 to construct
1 to operate

Vermont - One-Day Events: No permit or approval is required at present, but this is currently being reconsidered. The State does provide grants for one-day events and kits for paint "drop and swap" events and becomes aware of upcoming events through the grant application process and/or requests for the kits.
Permanent Facilities: State "certification" must be obtained, and a plan must be submitted

to the State in advance. At present, a 2 year certification is the maximum granted - 5 year certification is in the future.

Washington - One-Day Events and Mobile Sites: No permit or approval is required.
Permanent Facilities: Permits are required, but they are issued by local health districts, not by the State.

California - One-Day Events: A permit is required, although a variance from the permitting requirements is more commonly issued. However, at the present time and while Permit by Rule is being developed, "PBR letters" are being issued rather than variances.
Permanent Facilities: A permit to operate (or a variance from the permitting requirements) is required. But as just mentioned, California is currently in transition, shifting from the pre-audit mode to the post-audit mode through our proposed Permit by Rule regulations. Once in place, PBR will require compliance with specifics in the regulations and a notification to the State; one this has been accomplished, the local sponsor will be deemed to have a permit and can commence operations. The facility will be subject to inspection and audit at any time.

In closing, I want to briefly mention two new aspects being added to the California HHW program due to recently passed legislation: "Recycle Only Days" and waste from "small quantity commercial sources".

California's Health and Safety Code was recently amended by the passage of Assembly Bill 2597 (Tanner, 1990). This new statute, which becomes law on January 1, 1991, authorizes "recycle only days" and allows them to be conducted without a hazardous waste facility permit if certain conditions are met. The new statutes reads, in pertinent part:

> Section 25201(c) "A hazardous waste facilities permit is not required for a household hazardous waste collection facility operated by a public agency, or by any person under an agreement with a public agency, if all of the following conditions are met:

(1) The facility accepts only the following materials for subsequent transport to a recycling facility:
    (A) Latex paint.
    (B) Used oil.
    (C) Antifreeze.
    (D) Spent lead-acid batteries.
    (E) Nickel-cadmium, alkaline, carbon-zinc, and other small batteries.
(2) No hazardous wastes are received and handled at the collection facility other than the materials specified in paragraph (1).
(3) The materials are transported to the collection facility by the person who generated the material.
(4) The latex paint, antifreeze, and small batteries transported to the collection facility by any one individual at one time do not exceed a total volume of five gallons or a total weight of 50 pounds.
(5) Used oil transported to the collection facility meets both of the following conditions:
    (A) The contents of any single container do not exceed five gallons.
    (B) Each shipment of used oil does not exceed 20 gallons.
(6) The materials collected are not stored at the collection facility for more than 180 days, except that less than one ton of spent lead-acid batteries may be stored at the facility for up to one year. Over one ton of lead-acid batteries shall not be stored at the collection facility for more than 180 days.
(7) The materials collected are managed in accordance with the hazardous waste labeling, containerization, emergency response and personnel training requirements of this chapter."

California's Health and Safety Code was further amended by the passage of Assembly Bill 2641 (Wright, 1990). This bill, which also becomes law on January 1, 1991, authorizes local household hazardous waste collection programs, at their discretion, to accept waste from specified "small quantity commercial sources" (e.g., Conditionally Exempt Small Quantity Generators). The statute requires the Department of Health Services to promulgate regulations covering these activities. The Department will, in fact, include the requirements for these program activities in the Permit by Rule (PBR) regulations currently being drafted for both Temporary and Permanent Household Hazardous Waste Collection Facilities.

EPA Overview: New Pesticide Disposal Regulations

By: Tracy Bone, U.S. EPA
Office of Pesticide Programs
Pesticide Management and Disposal Staff

In 1988, Congress amended the Federal statute which governs all pesticides, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The EPA must now translate the amendments into regulations. The section of the amendments being written by the Pesticide Management and Disposal Staff is Section 19, "Storage, Disposal, Transportation, and Recall".

These regulations are being drafted and reviewed within the EPA and should be published in the Federal Register for public comment early next year. As the title of Section 19 suggests, the proposed regulations cover a very broad range, as well as new areas of authority for the EPA. Because of time constraints, this discussion will cover only the topics that directly affect pesticide disposal: disposal label statements and container design performance standards.

Label statements

Currently, pesticide labels address disposal in a generic manner. Most registrants use statements required or recommended by the EPA. Often, these generic statements do not provide enough specific information for the pesticide applicator to follow. For example, agricultural pesticides usually direct the applicator to "triple rinse the container and dispose of properly". This doesn't explain how to triple rinse or how to safely dispose of any waste. There are several different technical definitions of triple rinse and an infinite number of ways to dispose of waste materials.

Most pesticide labels found on products used in the home direct the applicator to dispose of the pesticide with the phrase, "wrap in newspaper and dispose in trash". Certainly, there are pesticides used in homes which should not be entering the municipal wastestream. Labels, as a rule, do not give information on how to recycle empty containers, clean containers (if necessary), clean up pesticide spills, and how to get rid of excess pesticide.

The EPA is proposing to change the label requirements and to require disposal data for each pesticide. The registrant will provide data on disposal at the time of registration or reregistration of each pesticide. This data will support disposal label statements specific to the pesticide. The registrant provides label language directing the pesticide user how to dispose of any excess pesticide as well as the container. The change in disposal label language should promote recycling of containers, and safer use as well as to reduce the amount of pesticide entering the environment through disposal.

Container Design

The EPA is also writing regulations describing design performance standards for all pesticide containers. The EPA is choosing performance standards for container design requirements so that the industry can continue to develop innovative packaging. The EPA does not want to prescribe that all pesticide containers be of a certain material, size, or design. But through experience, the EPA has identified a few areas of container design which often cause problems. The container design standards address these problems.

Pesticides are packaged in a wide variety of containers, but to facilitate the discussion, the regulations categorize all containers as either refillable or non-refillable. Refillable containers shuttle back and forth between the user and the dealer. The dealer refills the container each time it is empty. There is a set of container design performance standards for refillable containers, but they will not be discussed here.

Non-refillable containers, not non-refillable, will show up in an agricultural pesticide collection, a container collection program, or in the municipal wastestream. When this regulation is finalized and effective, all non-refillable containers must meet the proposed following standards:

1. Non-refillable pesticide containers must not glug (i.e., must pour in a continuous coherent stream) or drip when dispensed. This will reduce the exposure to whoever is disposing the container and will reduce the amount of pesticide going into the environment.

2. All non-refillable containers must meet a residue removal standard, which will limit the amount of pesticide residue remaining in the container after use and rinsing (if required).

3. There will be a container integrity test to assure that over a four-year period the container-pesticide combination will not fail or leak when stored according to the label.

4. Registrants of the pesticide containers must use one of the standardized closures. This is to facilitate the use of closed system transferring devices which reduce applicator exposure.

5. Every container must have the EPA registration number of the pesticide on the container. In the event that the label falls off, the contents can be tested for the pesticide identified by the registration number.

6. All containers must be made of recyclable materials and the material must be identified on the container.

The proposed design standards should promote safe use, and safe disposal of the pesticide as well as recycling of containers.

AGRICULTURAL CHEMICAL PLASTIC CONTAINER RECYCLING

By: Ralph F. May

ABSTRACT

Each year nearly 40 million pounds of high density polyethylene (HDPE) are used to package crop protection chemicals (CPC) in the U.S. The majority of these containers are emptied and triple-rinsed then burned or disposed of in area landfills. Open-field burning is temporarily allowed in some states. In other states, the law prohibiting such burning is not enforced. With the eventual banning of open-field burning of pesticide containers or the enforcement of existing laws and the well-publicized shortage of landfill space, the CPC industry is looking seriously at the available container disposal options. One option is recycling, the subject of a demonstration project carried out in several States in 1989 and 1990. These projects, coordinated by Dupont, the National Agricultural Chemicals Association (NACA), and various State regulatory and agricultural associations, addresses rinsing, collecting, granulating, shipping, and processing. The participants are collecting data on possible chemical residues remaining in the container and on the resin. Dupont and Central Container Corp. made new pesticide containers from the reclaimed resin and evaluated them in the laboratory and in the field. Additionally, the material can be used in such items as field drain pipe, pallets, and refuse-derived fuel. The CPC industry is supporting NACA and other state and provincial organizations in conducting additional demonstration projects, with a goal of learning how to easily and economically recycle all HDPE agricultural chemical containers.

Source Reduction, Recycling and Disposal

For many years the crop protection chemical user has been faced with the problem of disposing of the plastic bottles in which these valuable and essential products are packaged, stored and delivered. The tough, convenient containers, which have been carefully designed by the industry to protect the product from the environment and the environment from the product, become hazardous, unwanted trash as soon as the contents are emptied into the spray equipment. A large applicator can generate thousands of empty bottles each week during peak season, generating mountains of plastic. In 1987 nearly 20,000 tons of HDPE CPC bottles were emptied and disposed of in landfills or by open-field burning.

Landfills are rapidly filling up and closing. In the ones that still have adequate space, the landfill operators may be reluctant to accept pesticide containers or may charge a very high fee for dumping privileges. Plastic containers never degrade and needlessly occupy valuable landfill space.

Many farmers have solved their container disposal problem by burning the bottles at the point where they are emptied. This is a very attractive solution since it is immediate, complete and, in some instances, the ash can simply be plowed into the soil. Open-field burning, however, is not a very attractive solution to the farmer's friends and neighbors or to the EPA and state regulatory agencies because of air pollution and groundwater concerns. Some states have temporarily permitted open-field burning because of the lack of other options. Other states prohibit such burning but may not enforce the regulations.

NACA, EPA, and the CPC industry have looked at the available options for solving the pesticide container disposal problem. NACA has proposed a pesticide container management hierarchy which sets the following priorities:

1. Source Reduction (soluble bags, returnables, smaller containers, degradables, bulk),
2. Recycling, and
3. Disposal (landfill, incineration).

The CPC industry has addressed all the source reduction options and feels that each of those options can help to reduce the total number of containers. All the options, except degradables, are currently being utilized. No one option, however, can be expected to solve all the problems.

Soluble bags are commonly available with selected products and are attractive to most users. They are not a cure-all because they are expensive, may be fragile, are not well suited to liquids, and require a foil overpack.

Refillable containers of all sizes are becoming a very attractive alternative to the plastic jug. Most users, however, may not need 15-200 gallons and would prefer the 1 and 2.5 gallon plastic jug. Smaller returnables are possible but would be expensive to maintain and support. Additionally, if the container can be opened by the user, it has a chance of being contaminated. Bulk containers are currently favored by the large applicator, but may account for only a small percentage of product.

Smaller or fewer containers are possible with concentrated formulations or with products that have very low use rates. This is a long range goal of the CPC industry, but any solution requiring discovery or reformulation is of questionable value in solving the current container disposal problem.

Degradable technology is not yet sufficient for pesticide packages. Shelf life and package integrity are questionable, to say nothing of the actual degradability. Degradable packages do not have a measurable impact on the immediate pesticide container market.

The HDPE container has become a valuable choice in the packaging of crop protection chemicals. It is tough, chemically inert, attractive, convenient, and available in a variety of sizes and shapes. The 2.5 gallon jug, the most common size, suits a wide range of applicators' needs. It contains about 0.75 pounds of HDPE resin, has a standard 63 mm opening, can be handled easily, and is reclosable.

The tough, inert properties that make the HDPE container attractive also make it difficult to dispose of. If left exposed to the elements for 100 years, the HDPE container would probably not be visibly changed. A logical option for disposal is to collect and return properly rinsed HDPE pesticide containers for recycling.

Since HDPE is currently the only plastic used to make CPC containers, any recycling effort is not faced with the tedious sorting chore that is needed for residential plastic trash, which may contain polyethylene terephthalate (PET) soda bottles, polystyrene, and coextruded food containers. Additionally, the resin used in CPC containers is a very high grade blow-molding resin as required to pass DOT shipping tests.

Recycling properly rinsed pesticide containers can be carried out in many different ways, but current programs use a six step operation.

1. Collection
2. Granulation
3. Shipping
4. Cleaning
5. Extrusion
6. Re-use

Choosing a collection method is one of the most challenging parts of the operation. These can vary all the way from picking up the containers at the point of use to having the user deliver the empty containers to a designated collection point. One system has the user take the containers to the landfill where they would normally go. The containers are isolated and held for volume reduction and shipment to a processing facility.

The volume reduction step is needed because uncompacted containers are not cost-effective to ship. A 45-cubic-foot bale of bottles (500 pounds) contains about 1000 bottles that would occupy 650 cubic feet before compacting. This represents about a 15X compaction and gives a shipable material with a density of 11-12 pounds per cubic foot. A 45-cubic-foot box of granulated material would weigh about 1100 pounds for a density of about 25 pounds per cubic foot.

Shipping to a reclamation facility should be the only major transportation involved and will cost $0.50-$1.10 per mile. Assuming a full 40,000 pound load, a 1000 mile trip would cost $ 0.125-0.275 per pound.

At the reclaiming facility the containers are cleaned to remove labels, dirt, and chemical residues. This can be accomplished by a "wet" or "dry" procedure. With the "wet" process, the flakes are washed in hot soapy water then filtered and dried. Pesticide residues in this washwater are very small and occur as hydrolysis products of the active ingredients. The water should be recycled on-site to remove paper, foil, sand, and other dense material and must be periodically treated to remove soluble organics. The "dry" process involves air separation to remove light, fine material then heating under vacuum to remove organics.

The clean resin is dried and extruded into pellets. These pellets can be used to manufacture any appropriate blowmolded HDPE product. The clean, dry flake has a density of 25 pounds per cubic foot while the pellets have a density of 35 pounds per cubic foot.

PILOT PROJECTS

Mississippi

During the summer of 1989, all the ideas for a pesticide container recycling project were put to the test during a pilot project in Washington County, Mississippi. NACA and the Mississippi Department of Agriculture and Commerce began organizing the Mississippi Pesticide Container Rinsing, Collection, and Recycling Demonstration Project in the fall of 1988. The original project was under the direction of Dr. Earl Spurrier, vice-president of State Affairs of NACA, and Robert McCarty, Deputy Director of the Division of Plant Industry of the Miss. Dept. of Agricultural and Commerce.

The Mississippi Project was divided into four tasks:

Task 1 - Container Rinsing
Task 2 - Container Collection
Task 3 - Recycling
Task 4 - Project Assessment and Recommendations

The container rinsing task included media announcements, promotional displays and handouts, educational materials, and a survey of available rinsing equipment. ICI purchased and distributed 650 pressure-rinsing nozzles to the local users with brief written instructions for use. The Jet-Rinse nozzles which were supplied were manufactured by Select Styled Systems, Ltd., Palmer, Iowa.

Eight aerial applicators volunteered their properties to be collection sites. The empty, properly rinsed containers were delivered to these sites and placed in cotton wagons until the Washington County Commissioners arranged delivery to the initial processing facility. The original plan called for specific monthly collection dates but was modified to be open all summer beginning in May 1989. The

containers were periodically checked by Bill Barnett, Mississippi Department of Natural Resources, and his staff and certified to be properly rinsed, clean solid waste.

In March 1989, Dupont was given the opportunity to participate in the "Mississippi Project" and was permitted to conduct research in the area of compacting, shipping, sample collecting, processing, and reclaiming. All aspects of the program after the containers were delivered to the compacting facility were placed under the direction of Dr. Ralph F. May (Dupont). Robert McCarty, Mississippi Dept. of Ag., directed the overall program with specific responsibility for education, communication, collection, and initial transportation. NACA (Dr. Earl Spurrier, vice-president of State affairs, and Tom Gilding, Dir. of Environmental Affairs) coordinated the overall program. The program was continually reviewed by the NACA Pesticide Container Management Task Force which is comprised of representatives from 10-12 major CPC companies.

Volunteers transported the containers from the collection sites to a retired cotton gin in Elizabeth, Mississippi. The mill is owned and operated by Mr. Rex Livingston, a local farmer. The containers were placed on a chain drag and dropped into the top of the press. Each bale weighed about 500 pounds, contained about 1000 containers, and was tied with 6 wires or metal straps. The bales were moved manually and stored at the cotton gin until shipped.

On August 16, 28 bales of plastic were shipped by Dupont to United Resource Recovery (U2R) of Kenton, Ohio (a subsidiary of Hancor). The remaining 14,000 pounds were picked up and processed under the directions of Envirecycle of Kansas City. The objective of both companies was to assist the program in determining the feasibility of processing and reuse of the recovered resin.

U2R processed the first 14,559 pounds of baled bottles on February 26-27, 1990 to give approximately 12,534 pounds of reclaimed resin. 11,000 pounds of this material was in the form of extruded pellets. The 2025 pounds loss was attributed to samples, spillage, plastic labels (about 200 pounds), paper labels, closures, foil, and attached booklets.

Most of the pellets were used by the participating NACA companies for extrusion studies, primarily into containers. Samples of the unwashed flake, washed flake, pellet, wash water, and paper sludge were analyzed to determine possible pesticide residues.

In 1990, Mississippi expanded their collection program to about 8 counties in the Delta and Rex Livingston purchased a granulator which he transported from site to site. Over 200,000 pounds of plastic was collected in Mississippi in 1990.

Mississippi has become the point of reference for all other projects and has been compared, scrutinized, praised, and criticized. It is still, however, the yardstick by which all other State, Provincial, or Worldwide programs are measured.

Minnesota

In the Spring and Summer of 1989 while Mississippi was launching its container collection program, Minnesota was taking a second approach by concentrating on education and planning, in preparation for a pilot program in 1990. This "Rinse-and-Win" program involved detailed directions on how to rinse a pesticide container and why it is important to do so. Actual demonstrations were conducted at fairs and meetings reaching several thousand users.

In the Spring of 1990, Minnesota graduated from its Rinse-and-Win education program to a collection program covering about 8 counties. The users were asked to bring their properly rinsed containers to a designated site over a two or three day period. The containers were inspected by the Minn. Dept. of Ag. and granulated by Envirecycle. Between 15% and 20% were turned away because they were not considered to be properly rinsed. About 8,000 pounds of resin was collected.

The Minnesota Dept. of Ag. collected water rinse samples of selected bottles that were accepted and Dupont collected over 40 samples of flaked resin. Analysis of the resin samples showed the material to be cleaner than resin from any other program to date. This is attributed to the excellent education and inspection programs used in Minnesota.

Iowa

In Iowa, Dan Frieberg of the Iowa Fertilizer and Chemicals Association (IFCA) ran a State-wide program involving collection sites at over 30 landfills. The landfill operators performed the inspections and Tri-Rinse of St. Louis, Missouri performed the granulation. The containers were accumulated at 8 sites for ease of granulation and totaled about 40,000 pounds by seasons end.

Dupont collected resin samples from each granulation site to determine the total chemical residue remaining after the flaking operation. These data are not yet available but are expected to be very low since the landfill operators were serious about their inspection assignments and reportedly turned away about 50% of the containers.

Illinois

In Illinois, the Illinois Dept. of Ag. and the Illinois Fertilizer and Chemicals Association (IFCA) ran granulation demonstrations and education programs and collected about 4,000 pounds of bottles at Clayton Point Fertilizer as a pilot. On July 17, 1990, this location saw the first color sorting (grinding the white and natural jugs separate from the others) and the first use of a portable granulator.

The granulation was done on a new Cumberland 584 supplied by Dupont. The machine was placed on a trailer supplied by the Illinois Dept of Ag. and carried to dealer locations and the State Fair where it was used to help demonstrate the fundamentals of container recycling.

Illinois plans to run an education program and a one-county pilot in 1991.

Florida

Steve Dwinell, Florida DER, started a pilot program involving 4 large growers in South Florida. Dupont, United Agri Products, and DER conducted education programs, and UAP provided a granulator. The containers will be granulated in late 1990.

Texas

In late June 1990, the South Texas Ag Chem. Assn. put together an advisory council of industry, Texas Dept. of Ag., Texas Water Commission, and others to plan a 1991 pilot program in the Rio Grande valley. The West Texas Ag. Chem. Institute is making similar plans in the Lubbock region.

Other States

Several other states are getting involved and the program is expected to generate much more plastic in 1991. The industry goal is to have a national pesticide container recycling program in a few years.

Containers have been collected in Maine, Oregon, Missouri, and North Carolina while Virginia, Arkansas, Louisiana, North Dakota, Alabama, Michigan, and several others have begun plans and in some cases have put together an advisory council.

The current goal is to use all the natural and white resin to make recycled pesticide containers and to use all other materials to make drain pipe. Plastic Materials Group of Fayetteville, NC has expressed interest in assisting with the pipe effort.

SUMMARY

State Agricultural Pesticide Collection Programs

Dr. Charles P. Cubbage, Director
William Baney
Pesticide & Plant Pest Management Division
Michigan Department of Agriculture

ALABAMA

Dale Morgan, Department of Agriculture (205-261-2656)
Several counties in the state are collecting pesticide containers for disposal or recycling. There has been no charge for the collection of pesticide containers and response has been good. They are now in the early stages of setting up a farm pesticide collection, hopefully in 1991, on a small scale. It appears that legislature will be approving some funding for 1991.

ALASKA

Bill Burgoyne, Department of Agriculture (907-745-3236)
The state of Alaska does not have a farm pesticide collection program but co-sponsored a household hazardous waste collection in 1989 which included some pesticide products.

ARIZONA

Sheila Burgor, Department of Agriculture (601-255-4373)
When pesticide registrations are cancelled, they work with the farmers and distributors setting up sites for collections of products to be returned to the manufacturer.

ARKANSAS

Charles Flower, Department of Agriculture (501-225-1898)
The only collection of pesticides by the Department was the pick up of Dinoseb to be returned to the manufacturer. At this time, there are no plans for hazardous waste collections.

CALIFORNIA

In late September and early October 1989, an ag chemical collection program was held for one day each in Kings and Tulare counties, sponsored and supported by a wide variety of interests including the chemical and waste management industries, environmental, and citizen's groups, Cooperative Extension Service, the California Ag Commission, U.S. EPA, the counties' Farm Bureaus, and various units of government. Costs were set at $3.00 to $3.50 per gallon. Limits on the quantity accepted were set by transportation regulations at 1,000 pounds.

COLORADO

Ted Sterans, Department of Environmental Regulations (303-293-1744)
Several counties have household hazardous waste collections. These are usually done on as needed basis and pesticides are being collected at these pick up sites.

CONNECTICUT

Brad Roberior, Department of Environmental Regulation (303-566-5148)
Connecticut has already conducted three farm pesticide pick ups in 1990, the last collection was in June. They collected 8-10,000 lbs. of powders and 800 gallons of liquids. All types of pesticides were collected -- very old product and some newer products. DDT and Chlordane were very common materials collected but other products like Captan and Benlate were also collected. Charges for participation was based on the following: No charge for up to 100 lbs.; 100-500 lbs. -- state paid 75% of costs; 500 lbs.+ -- state paid 50% of cost. Farmers responded well to the collection project but there are still some farmers who did not participate that have pesticides for disposal. The cost of the 1990 collections were approximately $90,000. There is the possibility of yet another collection.

DELAWARE

The state of Delaware does not have a farm pesticide collection program.

FLORIDA

Keith Myhree, Department of Environmental Protection (904-488-0190)
The state of Florida has an on-going amnesty day collection program. In 1988 Florida legislature authorized funding of "Amnesty Days" hazardous waste collections. The purpose was to purge small quantities of hazardous waste, free of charge, from the possession of homeowners, farmers, schools, state agencies, and small businesses. Collection totals during March 1989 through April 1990 was 1,635,176 lbs. Many of these products were toxic pesticides. There was no charge for participants having 100 lbs. or less. Those having over 100 lbs. paid the actual cost to the hauler. Many farmers used the collection sites but there is a reluctance by them to pay for the disposal of over 100 lbs. The total budget was 1.8 million dollars.

GEORGIA

The state of George does not have a farm pesticide collection program.

HAWAII

Although it is not a continuing program, Hawaii Department of Agriculture conducted a collection for homeowners and farmers in 1986 and 1987. In 1989 a homeowner's only program was conducted. During a two-week period in 1987, approximately 8,400 lbs. of pesticides were collected at 6 sites and collection fees amounted to $14,500. DDT and Chlordane were the most represented products with some of the materials as old as 50 years.

IDAHO

Mr. Connolly, Department of Agriculture (208-334-2590)
The only collection at this time has been the Department of Agriculture's working with farmers on the recall of Dinoseb for return to the manufacturer. No farm pesticide collections are in the planning as of this date.

ILLINOIS

Illinois recently enacted HB 1398, an amendment to the Illinois Pesticide Act, and only awaits the Governor's signature before the Department of Agriculture, in cooperation with the Illinois Environmental Protection Agency, will develop a model program for the disposal of unwanted farm pesticides. Funding will come from the state treasury sources, already established by the Environmental Protection Act, the Hazardous Waste Fund, and the Hazardous Waste Research Fund that set $12.12/cubic yard or $.06/gallon fees on disposal of hazardous wastes in 1989 with increases in 1990. The legislation specified that local units of government and non-profit organizations shall be the operational units for the program's activities. The program shall not include pesticides from dealers or retailers. Furthermore, the program will not be subject to the rule making requirements of the Illinois Administrative Procedures Act. The grants will be limited to $25,000 and will require a 50% match. Program results will be reviewed by the state in 1991 at which time an inter-agency committee will make recommendations for a statewide program.

INDIANA

The state of Indiana does not have a farm pesticide collection program.

IOWA

Scott Cahall, Department of Natural Resources (515-281-8263)
The state of Iowa has "Toxic Clean-Up Days" which was initiated in 1988. This program is set up to purge hazardous waste from homeowners, farmers, and small businesses. Sites are set up two times each year and may run for several days. Participants are not charged but the maximum amount for each participant is 25 gallons and/or 220 lbs. of hazardous wastes. This program is funded by an annual permit fee of $25.00 that is charged to businesses that sell hazardous waste products. Collections will be going on each year.

KANSAS

Gary Bontz, Department of Agriculture (913-296-3016)
The state of Kansas has not had any collections as of this date. They have asked for funding in 1991 and it appears the funding will pass. Will be contacting other state agencies having collections for information.

KENTUCKY

The state of Kentucky does not have a farm pesticide collection program.

LOUISIANA

Jay Neu, Department of Agriculture (504-925-3789)
The state of Louisiana will have a pilot farm pesticide collection on October 24, 1990. State, county and private organizations have worked together to make the collection successful. Farmers will bring banned, unusable pesticides to a centrally located site for collection. The waste hauler, Chemical Waste Management, Inc., has agreed to incinerate the waste at no cost in the interest of public service; although there will be a hauling charge to the participant, ($1.00 per pound for solids and $5.00 per gallon for liquids. Farmers will not be required to manifest any pesticides. The state will be the generator and assume liability responsibilities. If this pilot program is successful, the state will initiate collection sites statewide.

MAINE

Henry Jennings, Pesticide Control Division (207-289-3891)
The state of Maine had a farm pesticide collection in the spring of 1988. The total amount of pesticides collected was 23 tons. The age of the pesticides ranged from 5 to 40 years old. Some of the most common materials were arsenicals, DDT, Dieldrin, Chlordane and BHC. There was no charge to participants and limits were not placed on the amount of waste that could be brought in to the site. The total cost was about $100,000. Hopefully they will have funding for a 1991 collection.

MARYLAND

Dennis Howard, Department of Environmental Regulation (301-861-5870)
The state of Maryland is working on a collection program. Hopefully, funding will be forthcoming by 1992.

MASSACHUSETTS

Tara Zadeh, Department of Environmental Regulations (617-727-3020)
The state of Massachusetts passed a regulation prohibiting long-term storage of hazardous waste at the farm level. In 1990, amnesty days were set up to allow pesticides to be brought to collection sites. A total of 80,000 lbs. of solids, 700 gallons of liquids (of which 600 gallons was 2,45-T) were brought to the sites. Some of the most common materials were DDT, Chlordane, Dieldrin, and arsenicals ranging in age from 5 to 50 years old. There was no state money used for the disposal. Participants paid the hauler. The state coordinated the pick up program between the farmer and the hauler. They felt that over 60% of the farmers participated. The total cost was over 1 million dollars. There are no plans for another collection. It was a one-time program for the farmers to get rid of their hazardous products. Total cost to the participants was estimated at $1 million.

MICHIGAN

Dr. Charles Cubbage, Department of Agriculture (517-373-1087)
The state of Michigan has broadened its 1988 pilot collection program from five fruit growing counties where 21,000 pounds of unusable pesticides were collected from 63 participants. The expanded Michigan Department of Agriculture (MDA) pilot program encompasses 24 out of 83 counties with a budget of $200,000 at eight regional collection sites. Participation is free and is based on response to a mailed survey on a first come/first served basis. Regional committees are responsible for their collections and lend credibility to the program, however, RCRA manifesting requirements for P-listed wastes have been problematic in getting full participation. Regional committees include staff from local county health departments that have experience in household hazardous waste collections, as well as the Cooperative Extension Service, Farm Bureau, and the Departments of Agriculture and Natural Resources. The grant funds for each regional committee are used exclusively for transportation, disposal, survey mailings, and other direct collection costs. Private funding and support has been initiated by the Michigan Chemical Council. The first regional collection netted 8600 pounds from 29 participants in a two county area at a cost of $18,000. The rest of the collections are scheduled for early November. The Governor is strongly supportive of the program and the Department of Agriculture plans include state-wide collections through 1992.

MINNESOTA

Minnesota has conducted a number of farm pesticide collection programs. A $200,000 two year legislatively funded program was initiated in 1987. The program utilized a variety of approaches ranging from free to several levels of participant fee structures with collections between April and August 1988 and on May 20, 1989. The results of the 1988 phase was presented at the 1988 Household Hazardous Waste Conference and was more fully described in the proceedings of that conference. However, the highlights include survey input that identified 41,605 gallons and 61,059 lbs. of pesticides reported by 475 respondents as needing collection. The collections that followed netted over 9,500 lbs. and 2,400+ gallons of pesticides with ages ranging from current to over 40 years old. Out of the program, seven recommendations were developed and are outlined in the project report.

MISSISSIPPI

Ed Dyess, Department of Agriculture (601-325-3390)
As of January 1, 1989, a special program was instituted to recycle plastic pesticide containers from farm and aerial applications. Over 20,000 containers from a single county were collected at eight sites from nine aerial applicators. Containers involving 48 pesticide products were triple rinsed and recycled into agricultural drainage tiles. The project involved testing at various points to assure that any residual pesticide materials would not create a problem. Results indicate that proper rinsing will provide raw materials suitable for a wide variety of non-food applications, e.g., the drainage tile.

MISSOURI

In 1990, the state of Missouri conducted a hazardous waste collection project which included household and farm pesticides. Several thousand pounds of hazardous waste was collected and disposed of by incineration. Some of the most common pesticides collected were DDT, Chlordane, Captan and arsenical products. Cost for the disposal was funded by the state of Missouri and therefore there was no cost to participants. It was estimated that farm participation was 10-15%. The total cost was approximately $65-75,000. Future collections will depend on state funding. They do not feel participants will pay for the cost of disposal.

MONTANA

George Algard, Department of Agriculture (406-444-3730)
In 1986, the state of Montana conducted a farm and commercial (small business) users collection program. Several tons of hazardous pesticides were collected for disposal. Some of the most common pesticides collected were DDT, Chlordane, and lead arsenates. Participation by farmers and commercial businesses was approximately 15%. There was no charge to participants. Total cost for the collection was $300,000. If funding is available, a second collection project will be scheduled hopefully in 1991 or 1992.

NEBRASKA

Gary Johnson, Department of Agriculture (406-471-2186)
The state of Nebraska does not participate in hazardous waste collections. There are a few county health departments that have conducted household hazardous waste collections.

NEVADA

Lee Lawrence, Department of Agriculture (702-789-0180)
The state of Nevada has not had any pesticide collections. They are in the process of setting up an amnesty day for a collection in 1991 or 1992.

NEW HAMPSHIRE

Kathy Schmitt, Department of Environmental Regulation (603-271-3550)
In April 1990, the state of New Hampshire conducted a farm pesticide collection. A total of 1,000 gallons of liquid and 5.5 tons of solids were collected. Some of the most common pesticides collected were DDT, Captan, Dinoseb, Malathion, and lead arsenate. There was no cost to the participants and no limits to the amount of pesticides they could bring to the site. A total of 132 farmers registered to participate in the collection and 85-90% participated in the collection. Some farmers did not participate because of the distance needed to travel to the collection site. The cost of the project was approximately $75,000.

NEW JERSEY

Ralph Smith, Environmental Protection Division (609-530-41340
In 1983 the state of New Jersey funded a household/farm hazardous waste collection. This was a pilot program to help the counties establish an on-going program. In 1983, 1,421 gallons of liquids and 7,280 lbs. of solid hazardous waste was collected with no charge or limits applied to participants. Some of the main pesticides were DDT, lead arsenate and Chlordane. There was a total of 322 participants, of which 20% were farmers and 80% were homeowners. The total cost for the project was $96,212. The state is no longer involved in the collection of hazardous waste. Counties usually sponsor one to two household/farm hazardous waste collections each year. There are no charges to the participants, although they are limited to 100 lbs. of solids and 10 gallons of liquid. Participants are not required to manifest hazardous waste at the collection sites. Counties are generators and the waste haulers complete applications for manifesting the hazardous waste.

NEW MEXICO

Lonnie Matthews, Division of Pesticide Management (505-646-2133)
The state of New Mexico does not have a farm pesticide collection program.

NEW YORK

The state of New York does not have a farm pesticide collection program. Some individual counties are sponsoring household hazardous waste collections and some small amounts of pesticides are being accepted.

NORTH CAROLINA

William McClellan, Department of Agriculture (919-733-6930)
The state of North Carolina has a continuing pesticide disposal public assistance program that was implemented in 1990. At the present time, approximately 280,000 lbs. of pesticides have been collected and disposed of by incineration when possible. In 1983 and 1984, quantities of pesticides were exported offsetting expenditures. All types of pesticides were collected such as DDT, arsenicals, Captan and Parathion. There is no charge to the participants which could be farmers, private homeowners, and small business owners. The cost of the program has been estimated at $500,000.

NORTH DAKOTA

Christine Roob, Department of Agriculture (701-224-2236)
The state of North Dakota had their first hazardous waste collection in 1980. As of today, they have had three more collections which include farmers and private households. A total of 39,000 lbs. of solids and 3,000 gallons of liquids have been collected. Some of the main pesticides collected were DDT, lead arsenate, Dursban, and 2,4-D. The funding for the project was an EPA grant. There was no cost to the participants and no limits to amounts that could be brought to the site. In some cases, the hauler went to the farms to collect the pesticides. EPA has discontinued funding and hopefully they will have state funds available to continue collections.

OHIO

Bob Walfarse, Department of Agriculture (614-866-6361)
The state of Ohio has not had any farm pesticide collections. They are having a meeting to set up funding hopefully by 1992.

OKLAHOMA

Kevin Holly, Department of Agriculture (405-521-3864)
The state of Oklahoma is getting funding to conduct a survey to see if there is a need for a pesticide collection program.

OREGON

The state has set up sites for the collection of pesticide containers for disposal or recycling. No plans for the collection of pesticides.

PENNSYLVANIA

The state of Pennsylvania does not have a farm pesticide collection program.

RHODE ISLAND

Liz Duguay, Department of Environmental Regulation (401-272-2781)
A farm pesticide collection is planned for the fall of 1990. They expect to collect 8-10,000 lbs. of pesticide waste. Their survey indicates that DDT, Chlordane, and lead arsenate will be the most common pesticides collected. There will be no charge to participants. They feel there is a lot more pesticides out there than reported. Farmers are reluctant to report chemicals to regulatory agencies. The total cost of the collection will be approximately $30-40,000.

SOUTH CAROLINA

Bob Bellenger, Department of Agriculture (803-656-5042)
The state of South Carolina has no state pesticide or hazardous waste collections. One county had a household hazardous waste collection which appeared to be quite successful.

SOUTH DAKOTA

Brian Scott, Department of Agriculture (605-773-3724)
The state of South Dakota had a household and farm waste collection in 1984. Approximately 10 tons of hazardous waste was collected. There was no charge to the participants for the collection. It appears there is a lot of pesticide waste on their farms which needs to be collected. They have asked for funding; hopefully they will have a collection in place by 1992.

TENNESSEE

Nox Writhe, Department of Agriculture (615-360-0130)
The state of Tennessee is working on funding and expects to have a collection in 1991 and 1992. They feel there are a lot of farms that have old pesticides that need to be collected.

TEXAS

Dorca Zaragoza, Department of Agriculture (512-463-7540)
The state of Texas had a farm pesticide collection in May 1990. They collected 25 tons of waste from 25 counties. Some of the main pesticides collected were Chlordane, lead arsenate, Captan, Guthion, and DDT. Many of these pesticides were very old and containers were starting to leak. There was no cost to the participants and it was privately funded. Dow Chemical Company agreed to do the incineration of the pesticides and a waste hauler agreed to do the transporting of the pesticides to the Dow Chemical incineration plant. The participation of the farmers was estimated at approximately 15%. There appeared to be some reluctance by some farmers to participate because they did not want to be identified as having hazardous waste. The cost of the collection was around $1 million. There are plans to have a collection in 1992, which will be funded by the state.

UTAH

The state of Utah does not have a farm pesticide collection program.

VERMONT

Sherri Aja, Department of Agriculture (802-828-2431)
The state of Vermont does not have a farm pesticide collection program at this time. However, they have requested funding for a collection program in 1992.

VIRGINIA

Dan Schwertzer, Department of Agriculture (804-786-3798)
The state of Virginia conducted a pilot program in June 1990. A total of 31,797 lbs. of agricultural pesticides was collected for disposal from 69 agricultural producers in three counties. The cost for disposal was $150,000. This did not included salary costs for county and state employees. Their Department of Agriculture is asking for funding to implement a statewide pesticide disposal program over a 3-4 year period.

WASHINGTON

In 1986, the Washington State Legislature passed SSB 5026 providing for a study to describe and assess the problems associated with agricultural chemicals -- "farmers have no appropriate economically feasible means of legally disposing of small amounts of . . . pesticides with uses cancelled or restricted after purchase." An initial survey indicated that nearly 42 tons of waste pesticides were on Washington farms and that the estimate was undoubtedly low. As a result of the study, there have been collections in 1988, 1989 and 1990. Over 60 tons of pesticides were collected at no cost to the participants. The collection of pesticide waste is funded by a small sales tax (.08%) applied to hazardous waste chemical sales. Over 180 different products were collected with DDT and lead arsenic as the main components. Many of these products were in the 25-50 year old range.

WEST VIRGINIA

Bob Frame, Department of Agriculture (304-348-2209)
The state of West Virginia does not have a farm pesticide collection program. However, a survey has been conducted and hopefully funding will become available for a 1992 collection program.

WISCONSIN

Dave Frederson, Department of Agriculture (608-266-4509)
The state does not have a farm pesticide collection program. Some counties have sponsored household hazardous waste collections which included small amounts of pesticides.

WYOMING

Tim Link, Department of Waste Management (307-777-7752)
The state does not have a farm pesticide collection program. Some counties have sponsored a household hazardous waste collections and local ranchers have disposed of some banned pesticides at these locations.

U.S. AGRICULTURAL PESTICIDE COLLECTIONS

Paint: Overview of Collection and Management Methods

By Dana Duxbury

Americans buy large quantities of both oil (solvent based — SBP) and latex (water based) paint. Three gallons of unwanted paint is stored in the average American home. When a family moves, does a major cleanout, or changes the color of their house, old paint is discarded — usually in the rubbish. But much unwanted paint is either reusable, or recyclable for its fuel value. Some, however, should be treated as a hazardous waste.

Paint contains: solvents (water, or toxic or combustible volatiles); vehicle solids (binders that hold other ingredients together — usually non-hazardous); pigments (give paint color and body, some contain toxic heavy metals); fillers (function similarly to pigments but without surface flaw masking properties — usually clay, talc, or chalk), and additives (dryers, sag control agents, preservatives).

- 50+% of collected HHW is paint;
- paint collected in San Bernardino County, CA, averages 10-years-old;
- most programs collect only SBP, which is considered hazardous by federal definition;
- California, Washington and Minnesota recommend treating latex paint as hazardous;
- most collection programs consolidate (bulk) paint on site into 55 gallon drums to reduce shipping costs;
- most consolidated SBP is recycled by burning as supplemental fuel (often in a cement kiln);
- PCBs in SBP and lead in latex paint are found above regulatory limits in some drums of consolidated paint even though both were banned many years ago; mercury is still used as a preservative in some latex paint;
- many programs require consolidated SBP to be tested for PCBs;
- programs collecting both kinds of paint find it evenly divided, newer areas collect far more latex. Vermont, in September 1989, collected 1,500 gallons of paint at a "drop-and-swap" — 775 were sent to be burned as hazardous waste, 500 (150 SBP) blended for reuse, 225 "swapped";
- most reuse-recycling programs to date have collected only latex paint;
- up to 50% of latex is reusable as paint — the rest is treated either as solid waste or mixed with SBP and sent to be burned.

SBP has been handled at collection sites in a variety of ways:

- Evaporate: A few programs open SBP and let the volatile organics evaporate — this is considered very irresponsible (air pollution) and potentially dangerous (flammability);
- Lab Pack: Up to 20 gallons of liquid, in individual cans is packed with absorbent material in 55 gallon drums and sent to a hazardous waste landfill at a cost of $340+ per drum.
- Containerized: One hazardous waste facility (Marine Shale, LA) accepts individual cans of SBP packed into 55 gallon drums. The drums average 32 gallons of paint, the cost to burn the SBP is $375 per drum.
- Consolidated (bulked): Paint cans are opened and scraped out (a metal bar system that fits over the mouth of a drum has been designed) or crushed in a modified log-splitter into 55 gallon drums. Some programs have been able to recycle the cans, but most treat them as solid waste. Consolidating paint reduces transportation costs but takes time — an hour per 55 gallon drum for scraping or crushing. Volunteers — even prisoners on work release — sometimes do the work. Consolidation needs a well ventilated area, respirators, and a hood if indoors.

Most pourable consolidated SBP is sent to a fuel blending facility which blends different fuels to meet customer specifications ($170-250 per drum). Some sludges are burned in a hazardous waste incinerator ($395 per drum). Up to 10% of consolidated drums may test over 50 ppm for PCBs requiring the paint (under Federal Toxic Substance

Act) to be sent to a hazardous waste incinerator licensed to burn PCBs at a cost of $850 per drum. The PCB test can cost $100 per drum for contractors who do not have their own labs. Minnesota sends all consolidated paint to a PCB incinerator.

Very little SBP collected at HHW programs has been reused — which would lower waste management costs. Where it has happened, cans are opened to see if the paint is unpourable, if it has been frozen, or if the color is undesirable. Reusable paint (20-30%) is sieved to remove solids and usually repacked into five gallon pails and then given away to local public or non-profit groups — housing authorities, church or theater groups. San Diego gives SBP to Mexico because sale and use have both been banned in southern California as an air pollution prevention measure. No major paint companies have reprocessed collected SBP. Seattle paint companies are implementing a pilot program to reprocess collected SBP.

Logistical problems make paint exchanges difficult at collection days. Exchanges have been more successful at "drop-and-swaps," recyclables only programs, or at permanent facilities. Up to 40% of the reusable cans of paint brought to Minnesota's permanent facilities are taken.

Overall, latex paint is about half of the total paint collected by HHWM programs which accept LP and SBP; paint is usually about half of the HHW collected.

Throughout the country, HHWM programs historically have not collected LP because neither RCRA nor any of the states designate it a hazardous waste. California, Minnesota and Washington states, recognizing that certain LPs contain both lead and mercury, recommend collection of LP.

The second motivation to collecting LP has been the desire to maximize recycling of both HHW and the solid waste stream.

The percentage of collected LP which is reusable varies significantly and is largely climate related. LP can dry out, "sour", or freeze. In southern California, nearly 100% of the collected LP is usable; in Minnesota, Vermont and Washington 45% is still usable, and in Alaska none remains usable. "Recycled" LP is usually made available: for "reuse" as is; or "reprocessed" by filtering out solids, consolidating in 55 gallon drums, blending (usually with added water) and repackaging.

Collected LP has been:

- given away for reuse as is either at a special paint "drop 'n swap" program or at a permanent HHW facility;
- sorted, consolidated, blended and repackaged (often on site) and then given away to local public agencies (housing, transportation, parks, schools) and non-profit groups (church, theater);
- sorted, consolidated and sent to a paint company (Major Paint, CA) which mixes it with its waste water discharge and returns 20% more volume to the HHWM program sponsor in a newly labelled can. Most of the returned paint is given away for anti-graffiti programs. The company charges $2.00 per gallon plus a 12% handling charge. The program was developed because of stringent waste water permit conditions;
- sorted, consolidated and sent light colored LP to local paint companies (Seattle, WA) to be tested for hazardous contaminants and technical properties, batched and sold as indoor primer. The pilot LP recycling project in Seattle was sponsored by the city and the Regional Paint and Coating Association. The paint is labelled "Community Pride"and sold in 19 stores for $1.00 per gallon less than other brands;
- sorted, consolidated and reprocessed by the contractor (Safety Specialists, CA) and sold at $3-4.00 per gallon to non-profits;
- sorted, consolidated, reprocessed (SEM Products, CA), returned to the sponsor;
- in Canada, the Canadian Paint and Coatings Association has agreed to take, as an experiment, reusable paint received at HHW collections, pay the locality $2.00 per gallon for the paint, reprocess it into indoor LP and SBP primer and give it to local governments.

Both lead and mercury are hazardous constituents of concern in LP.

In the 1970s, allowable levels of lead in LP were dropped from .5% to .06%. Lead levels in some collected LP may require hazardous waste management.

Mercury has been used as a biocide in some LP — a preservative in interior LP and an anti-fungicidal agent in exterior mildew-resistant paints. By August 20, 1990, paint manufacturers voluntarily agreed to remove all mercury from interior LP. The EPA allowed old mercury containing paint below 200 parts per million (ppm) to be sold after the June announcement. Information about the mercury content of LP up to three years old is available from the EPA Pesticide Hotline 1-800-858-7378; information on older paint is not readily available. Program sponsors are advised not to allow interior LP above the 200 ppm level to be used indoors. See box on page three for new suggested collection program protocol.

Most programs treat non-usable LP as a hazardous waste, burning it as a supplemental fuel or sending it to a hazardous waste incinerator. Seattle is solidifying unusable LP and hopes to be able to send it to a solid waste landfill.

Paint Collection Recommendations

For Drop 'n Swap Programs

Separate LP Paint into two categories

(A) Exterior and Interior/Exterior (B) Interior

(A) Exterior and Interior/Exterior LP may be swapped by stickering the can] "FOR EXTERIOR USE ONLY."

(B) Interior LP (unless less than 200 pm mercury content can be confirmed) can only be swapped if stickered "FOR EXTERIOR USE ONLY." It may not hold up as well.

For LP Paint Consolidation Programs

Usable LP can be consolidated. It should be tested for mercury; if it tests lower than 200 ppm it can be used as interior or exterior paint, if over 200 ppm it must be stickered for exterior use only.

Unusable LP which tests over 200 ppm mercury must be sent to a hazardous waste incinerator permitted to burn D009 waste.

HOUSEHOLD PAINT RECYCLING PROGRAMS IN NORTH AMERICA

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ABSTRACT

This paper reviews household paint recycling programs in the United States and Canada. Disposing of old latex and solvent-based paint is a major cost center for household hazardous waste collection programs. Recycling leftover paint is an environmentally and economically-sound alternative to disposal.

Four paint recycling approaches are described: paint swaps; blending old paint with new; low-tech recycling; and high-quality recycling. Next, local recycling efforts are described and characterized in California, Minnesota, Oregon, Vermont, Washington, and Canada.

The paper discusses six issues which will shape the future direction and success of paint recycling efforts: 1] the need to recognize old latex paint as a hazardous waste (existing data is reviewed); 2] how a ban on mercuric fungicides in latex paint may affect recycling; 3] how PCBs may affect paint recycling; 4] the impact of limited manufacturing capacity; 5] the need for cooperation between government and industry; and 6] the need to establish adequate markets for recycled paint.

The paper concludes that paint recycling efforts are expanding throughout the United States and Canada, and if the issues described in this paper can be addressed, recycling old paint can be a viable way to turn a costly waste disposal problem into a community asset.

INTRODUCTION

The 1980's saw tremendous change in how hazardous wastes were managed. Now, in the 1990's, local government is exercising leadership to collect and properly dispose of hazardous wastes generated in the home, including leftover paint.

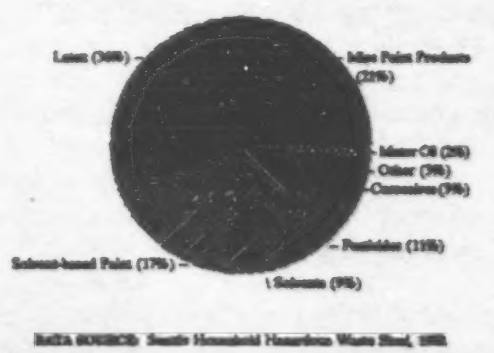
In 1981 only one jurisdiction in the U.S. collected household hazardous waste. At the end of the decade, over 600 communities had initiated collection programs. Legislation in a number of states now mandates household hazardous waste collection programs.

Leftover paint is the major constituent of household hazardous waste collected by state and local governments. Post-consumer paint ranges from 50% - 80% of the household hazardous waste collected by communities nationwide. Typically, over half of this paint is latex; with solvent-based paint representing the rest.

FIGURE 1 and 2 show the composition and disposal cost of household hazardous waste collected in one typical community. Leftover paint made up 60% of all household hazardous waste collected throughout the year, and accounted for 53% of all disposal costs. Latex paint alone was 44% of all waste collected. Solvent-based paint accounted for 16% of all waste.

FIGURE 1
HHW COMPOSITION

FIGURE 2
HHW DISPOSAL COSTS



The high cost of handling and disposing of leftover paint places a significant burden on household waste collection programs. Because of the volume and disposal cost of leftover household paint, there is growing need to find alternatives to traditional hazardous waste disposal. Paint recycling programs have been a response to this need.

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Today, there are probably more than 100 million gallons each of old latex and solvent-based paints stored in American homes which await disposal.

This paper describes the four approaches for recycling and reusing old paint, and sketches local recycling efforts around the United States and Canada. Finally, it discusses some of the issues which will affect paint recycling in the future.

1. FOUR APPROACHES TO PAINT RECYCLING

Four approaches are currently used to recycle leftover household paint. These are displayed in TABLE 1.

TABLE 1
MAJOR APPROACHES TO PAINT RECYCLING

- PAINT SWAP
- BLENDING OLD PAINT WITH NEW
- LOW-TECH RECYCLING
- HIGH-QUALITY RECYCLING FOR RESALE

The approaches range from the simple to the complex, and are described briefly below.

PAINT SWAP AND REUSE PROGRAMS: Leftover latex and solvent-based paints are handled through paint swaps and other reuse programs. The paint is used without reprocessing, often in its original container. Paint Swaps, like those held in central Vermont; San Francisco; and Snohomish County, Washington, allow residents to drop off their old paints. The paint is inspected by staff and full or nearly full cans of good-quality paint are put on display and made available to individuals, companies or organizations. Typically much more paint is turned in than is taken away. However, swaps can reduce the volume of paint for disposal by about 25%.

Related to paint swaps are other reuse programs. Instead of placing the paint on public display, high paint use community groups are specifically recruited to take the leftover paint. Cans of good-quality paint are donated to groups such as theater groups, churches, or used for anti-graffiti campaigns.

BLENDING OLD WITH NEW PAINT: This approach is currently in use for latex paint only. In the blending approach, leftover latex paint is blended with virgin material by a paint manufacturer to yield a new paint. Leftover paint is a minority constituent or filler in these batches, comprising about 10 - 20% of the finished product. Mis-tinted lots of latex and

solids from manufacturing wash water may also be blended into the product.

The resulting latex paint is a low-end exterior product. It can be given away or sold at a low price. A Major Paint Company is the only company which regularly blends leftover residential paint to make a recycled paint. A Major Paint Co. has contracts to accept leftover latex from a wide variety of communities in California. The paint is labeled as "Maintenance Paint", and is sold back to the jurisdictions which collected the waste paint which goes into it. In turn, these jurisdictions may sell or donate the paint to other users.

Many paint manufacturers around the country consume their own mis-tints or odd lots of paint in this way, but all of this paint is pre-consumer. In addition, a few paint manufacturers scattered throughout the country rework large lots of leftover paint from painting contractors as a customer service.

LOW-TECH RECYCLING: The low-tech recycling approach yields a very low grade 100% recycled paint. In most cases, only latex paint is handled in this manner.

Latex paint turned in at a household hazardous waste collection program is sorted, coarsely strained, and canned in 5 gallon buckets or 55 gallon drums. No adjustment is made to the paint itself to control its quality or color. Consequently, every drum or batch is different. San Diego County is an excellent example of this type of program.

Because each drum or batch of paint is a different color, with different handling characteristics, paint produced by low-tech recycling is usually given away free and used to paint over graffiti. While low-tech, this approach is also very low cost, and can be an effective way to reduce the volume of latex for disposal significantly -- 50% or more.

HIGH-QUALITY RECYCLING FOR RESALE: This approach also produces a 100% recycled paint -- however active quality control allows the paint to be sold in competition with virgin paint. Sales revenues off-set recycling costs. Seattle's and Laidlaw's canadian recycling programs are examples of this approach.

Quality is carefully controlled during sorting and reprocessing. Leftover paint is sorted to exclude paints that will compromise the quality of the finished product or render it hazardous. The paint is bulked into batches 1,000 gallons or more. The characteristics of each batch are tested using standard paint industry procedures. Paint color and characteristics are adjusted with additives until each batch meets a uniform standard. The paint can then be sold for about $5/gallon.

In the United States, most high-quality paint recycling programs do not handle solvent-based paint. This is often due to restrictions on volatile emissions (as in California), or simply the high cost of handling and recycling solvent-based paints, compared to other management alternatives. However, Laidlaw's recycling program in Canada does recycle solvent-based paint. Most U.S. communities which collect solvent-based paints get rid of them through a swap program or have them blended for incineration.

The next section describes local paint recycling efforts across the country.

2. DESCRIPTION OF PAINT RECYCLING PROGRAMS

Recycling leftover paint is a relatively new phenomenon. At present, it is concentrated in California, Minnesota, Oregon, Vermont, Washington State, and Canada, as described below.

TABLE 2 outlines these paint recycling programs. They are described further in the pages which follow.

TABLE 2
U.S AND CANADIAN PAINT PROGRAMS

LOCATION/COMPANY	PROCESS	LATEX OR SOLVENT-BASED
CALIFORNIA		
A MAJOR PAINT CO.	Blending	Latex
SAFETY SPECIALISTS	Low-Tech	Latex
SEM, INC	Low-Tech	Latex
	High-Quality	Latex
SAN DIEGO COUNTY	Low-Tech	Latex
SAN FRANCISCO/NORCAL	Swap	Latex & Solvent-based
	Blending	Latex (via Major Paint)
CA PAINT TASK FORCE	High-Quality	Latex (via SEM, Inc.)
MINNESOTA		
HENNEPIN COUNTY	Disposal (may consider other options)	Latex & Solvent-based
OREGON		
PORTLAND METRO	Low-Tech (1988) (currently considering Swap and High-Quality)	Latex (via Safety Specialists)
VERMONT		
CENTRAL VT PLANNING COMM.	Swap (currently considering High-Quality)	Latex & Solvent-based
WASHINGTON		
SNOHOMISH COUNTY	Swap	Latex & Solvent-based
SEATTLE	Swap (reuse)	Latex & Solvent-based
	High-Quality (currently exploring permanent latex program)	Latex & Solvent-based
CANADA		
LAIDLAW AND CPCA	High-Quality	Latex & Solvent-based

SOURCE: Mosley & Associates, 1990

[N.B.: If you have a paint recycling program which is not described below, please notify the author, at 206-628-0657, so it can be included in the future.]

CALIFORNIA

A MAJOR PAINT COMPANY: (BLENDING). A variety of California communities recycle leftover household latex paint using the services of A Major Paint Company, associated with Standard Brands. A Major Paint Co. reprocesses the paint from each

community and returns it (plus 10-20%) to the agency that supplied it. Major Paint services the cities of San Francisco, Sacramento and Ventura; and the counties of San Bernardino, Ventura, San Diego and Contra Costa. Major Paint provides this service for an "at cost" price, described further, below.

The blending process used by Major Paints yields a product which contains about 20% recycled leftover household latex paint (recently raised from 10%). This paint is blended with solids from the company's rinse water, its mis-tint paints, and virgin material to manufacture a new paint. Major Paint routinely rinses its processing vats with water. This rinse solution is left to settle in a supernatant tank, where much of the water is decanted out, leaving a thin latex paint. This is then mixed with a small amount of leftover household latex paint and mis-tints. Subsequently, new emulsion, pigments and other virgin constituents are added to manufacture a beige latex paint which is about 20% recycled.

The paint is of a consistent quality, but there is some color variation between batches. Processing capacity is limited to 20% of the company's total output of Maintenance Paint.

Until raising the post-consumer content from 10% to 20%, Major Paint reported that it was nearing its capacity limit. In the past few years there has been a large increase in the amount of leftover household paint sent to them. For example, the city of San Francisco sent 1,000 gallons for reprocessing in all of 1988; but matched this in only the first half of 1989.

Major Paint originally offered recycling for $2.00 per gallon, at or below true cost, as a community service. Because of the extraordinary volume of paint processing requests, they can no longer afford to do so, and have recently raised the per gallon charge to $2.83. An additional price hike up to the $3.00 range may be imminent. Major Paint would like to see other paint companies offer the same service to ease its capacity problem.

SAFETY SPECIALISTS, INC.: (LOW-TECH RECYCLING). This company serves primarily the Santa Clara County area, but its range is significantly larger – it has even recycled latex paint from Portland, Oregon. In contrast to Major Paint, Safety Specialists is a hazardous waste management firm which contracts with a variety of communities to run household hazardous waste collection events, or to simply handle their wastes. Paint recycling grew out of Safety Specialists' desire to find economical alternatives for disposing of leftover latex. As part of its household hazardous waste services, it sorts the paint, reprocesses it, and arranges sales procedures for the agencies involved.

Safety Specialists charges sponsoring agencies $2.50 per gallon for collecting and handling the leftover latex, and then sells the recycled paint to volunteer and civic groups for $1.00 per gallon. The sales price will shortly go to $3.00 per gallon.

Leftover latex paint is reprocessed in a sort-bulk-filter procedure. The paint is first sorted and bulked into ten different light colors, plus an additional five dark colors set aside to be used as tints. Each color is bulked in 55-gallon drums and then filtered through a coarse 60 mesh screen into 250-gallon batches. Colors vary significantly between batches. The only quality control testing done so far has been UV light exposure to test fading characteristics.

In contrast to many other recyclers, Safety Specialists helps market the paint. Post-consumer paint content is 100%, and it is used in exterior applications (e.g. anti-graffiti).

While the firm may be moving towards a more high-quality process, past paint has had varied in color and quality between batches, and has had a coarse texture.

Volumes handled by Safety Specialists vary because the firm relies mainly on individual round-up contracts for their paint supply. In the last 14 months Safety Specialists has recycled 15,000 gallons of latex paint, an average of 1,071 gallons a month. Safety Specialists' Gavin Brownlee projects this quantity as increasing over time, but can not quantify, due to the fluctuating nature of the business.

SEM INC. & SAN MATEO CO.: (LOW-TECH & HIGH-QUALITY RECYCLING). SEM is a contractor to San Mateo County to reprocess the County's latex paint. The County sorts and delivers the paint and SEM uses a sort/bulk procedure to produce a low-tech, low- grade paint. The finished product is then returned to the County for its own use.

SEM and San Mateo Co. have recently coordinated with the California Paint Task Force, to test latex paint recycling and its ability to meet California Department of General Services paint specifications. The County collected the paint from 70-200 cars per day on an appointment basis, and performed a preliminary sort. The paint was then sent to SEM, who conducted additional sorting. The paint was processed by coarse screening, blending, coloring additives, fine filtering, and canning.

The resulting exterior latex paint has been subjected to both laboratory and field tests. The exterior paint met all state specifications except alkaline resistance and scrubability. The paint was also applied to buildings at the Cal Expo site in Sacramento as part of a field test.

SAN DIEGO COUNTY: (LOW-TECH RECYCLING). San Diego County has collected and recycled latex paint as part of its household hazardous waste collection program for more than one year, using a combination of round-ups and fixed-site collection sheds. The paint is sorted it by color and bulked on site as it is, into 55 gallon drums. The paint is then distributed free to governmental agencies for their graffiti eradication programs. There are no other uses for the paint.

This program is inexpensive and easy to do. However, the paint is inconsistent in color and quality from batch to batch.

CITY OF SAN FRANCISCO & NORCAL: (SWAP & BLEND). Norcal, the City's contractor, receives latex and solvent-based paint through a household hazardous waste collection shed at its transfer station. A moderate amount of unused latex and solvent-based paint is given away to the public at an on-site paint swap. Most of the remaining latex is sent to Major Paint for blended recycling. The reprocessed paint is given away to governmental agencies and civic and volunteer organizations.

CALIFORNIA PAINT RECYCLING TASK FORCE: (HIGH-QUALITY RECYCLING). This program is just starting up and many of its details are not yet finalized. The Task Force has initiated a pilot program with SEM and San Mateo County to test high-quality recycled latex against California State specifications (see above). What is most innovative in this pilot program is a plan to work with the state's Department of General Services to develop a market for recycled latex with state agencies.

The Task Force is also working with the California Prison Industry Authority to explore whether prison labor can be trained and used for collection, sorting, consolidating and reprocessing recycled latex paint.

The Paint Task Force has also worked with the State Legislature to pass Assembly Bill 2597 and A.B. 2834 to exempt latex paint collection events and reprocessors from stringent permit requirements.

MINNESOTA

HENNEPIN COUNTY: (DISPOSAL). In the spring of 1990 the county had excluded latex paint from its household hazardous waste collection program, in order to stay within its HHW budget. It had elected to incinerate the latex paint collected by a series of round-ups at an approximate cost of $10 per gallon, which, due to the large volume of latex paint being collected, would have exceeded the budget for 1990 by approximately 30%. This left no legal disposal option for household latex paint, since it was not legal to dispose of it at a landfill, and householders could not give it to the county. One effect of the latex paint exclusion was that collection quantities of other HHW's decreased. Apparently many people were bringing other HHW's only because they were already bringing latex paint.

Consequently the County's Board of Commissioners decided to include latex paint in the list of HHW's accepted at the new transfer station at Brooklyn Park, opening August 6, 1990. The county plans to open three more transfer stations over the next four years, continue a program of round-ups and start a wastemobile similar to the one King County in Washington state is using. The County is now exploring the possibility of recycling or otherwise recovering latex paint.

OREGON

PORTLAND METRO: (SWAP & LOW-TECH OR HIGH-QUALITY RECYCLING). The Metropolitan Service District (Metro) is attempting to develop a program to recycle, swap or municipally-landfill latex paint gathered at its household hazardous waste shed, located at the South Transfer Station.

Portland has previous recycling experience. In 1988, Portland Metro contracted with Safety Specialists, Inc. to conduct a household hazardous waste round-up. Safety Specialists recycled the latex paint collected through the round-up.

VERMONT

CENTRAL VERMONT REGIONAL PLANNING COMMISSION: (SWAP & LOW-TECH RECYCLING). Central Vermont has sponsored several collection events for latex and solvent-based paint, both. The paint was sorted for handling by a variety of means, including a paint swap.

The first collection event received about 1,600 gallons of solvent and latex paint. Staff from Sherwin-Williams helped sort the paint as follows: 14% (225 gallons) was handled through a paint swap; 48% (775 gallons) was blended as a fuel for incineration; about 6% (100 gallons) was contaminated and required disposal as a PCB; and 31% (500) gallons was bulked together through a low-tech recycling program and given away (150 gallons were solvent-based paint, and 350 gallons were latex).

The Central Vermont Regional Planning Commission is currently exploring other low-tech and high-quality programs for latex paint.

WASHINGTON

SNOHOMISH COUNTY: (SWAP). In 1990, the County initiated a paint swap one week in advance of its annual household hazardous waste round-up. The Swap was intended to reduce the volume (and disposal cost) of latex and solvent-based paint collected at the round-up, by first giving residents an opportunity to donate their paint to be given away to all comers (between 65% and 80% of all HHW collected is paint). Staff from local agencies opened, stirred and inspected all cans. 1/3-full gallon cans and ½-full quart cans of uncontaminated paint in good shape were set aside for swap. Approximately 25% of the paint (1,600 gallons out of 6,000) was given away in this manner. After the swap, any excess (about 75%) was sent to a hazardous waste disposal site. About 500 gallons of swapable paint had not been picked up by the public by the end of the event. An interesting note is that the age breakdown shows the majority of users in 1990 to be over 50 years of age (over 65:28%, 51-65:25%, 31-50:42%, 21-30:4.7%, under 21:.3%).

SEATTLE ANTI-GRAFFITI SQUAD: (SWAP/REUSE). At the last (ever) Seattle-King County Household Hazardous Waste Round-Up on June 3, 1989, the majority of the latex paint turned in at the Bellevue site was given to the Seattle Engineering Department for use on public buildings to cover graffiti. Off-the-cuff estimates of usage rates put the average at 50 gallons per week, and they had not used it all up a year later, by June 1990. Costs were minimal, using volunteer help to collect and sort it.

SEATTLE PAINT RECYCLING & DISPOSAL PROJECT: (HIGH-QUALITY RECYCLING). This project was the first in the nation to prove the technical and economic feasibility of high-quality latex recycling to produce a consistent, marketable product. Four production-scale batches of "Community Pride" recycled latex were manufactured and tested in the laboratory and in the field.

Seattle's project also demonstrated the feasibility of municipally landfilling the non-recyclable fraction as a non-hazardous solid waste.

Finally, the project investigated the feasibility of a high-quality recycling program for leftover solvent-based paint. While technically feasible, solvent-based paint recycling lacked a viable market niche, and was not very economical.

CANADA

LAIDLAW ENVIRONMENTAL SYSTEMS & THE CANADIAN PAINT & COATINGS ASSOCIATION: (HIGH-QUALITY RECYCLING). Laidlaw Environmental Systems, Ltd., a waste firm which conducts the majority of Household Hazardous Waste collection programs in Canada, teamed up with the Canadian Paint and Coatings Association in 1989 and 1990 to test the feasibility of high-quality recycling of latex and solvent-based paint. Over 200,000 liters (about 53,000 gallons) of leftover paint were collected over a one-year period. 56% was latex, and 44% was solvent based. Laidlaw carefully sorted containers 1-gallon or more in size. The resultant paint was then processed by a CPCA affiliate in Ontario. Each batch was tested for heavy metals and isocyanates, and reprocessed to conform to uniform paint specifications. The paint was drummed in 45-gallon containers for use by industry, and governmental agencies. CPCA received no profit from the paint.

In addition, Laidlaw has been working with the Canadian Tin Plate Recycling Council to investigate the feasibility of recycling empty steel paint cans. Laidlaw reports that it appears that the cans are recyclable.

3. ISSUES

Several issues will shape the direction of future household paint recycling efforts, outlined in TABLE 3.

TABLE 3
ISSUES SHAPING THE FUTURE OF PAINT RECYCLING

1. OLD LATEX AS A HAZARDOUS WASTE
2. BAN ON MERCURIC FUNGICIDES
3. PCBs IN OLD PAINT
4. MANUFACTURING CAPACITY
5. COOPERATION BETWEEN GOVERNMENT AND INDUSTRY
6. NEED TO ESTABLISH MARKETS & DEMAND

SOURCE: Morley & Associates, 1990.

These issues are discussed below.

1. OLD LATEX PAINT AS A HAZARDOUS WASTE.

Many household hazardous waste collection programs do not accept leftover latex paint on the belief that old latex is not truly hazardous. Many collection programs -- particularly those in the mid-west and along the east coast -- only accept solvent-based paint. Residents are asked to dry and dispose of the latex themselves, along with their garbage.

However, unsorted leftover residential latex paint is often a hazardous waste.

Tests conducted by twelve jurisdictions to characterize latex paint are described below. The conclusion: unsorted latex paint can often be hazardous because of high lead, mercury or cadmium levels.

Testing to determine hazardous characteristics of latex paint is done on a sporadic basis by paint recycling and disposal programs around the country. Most states categorically exempt household-generated latex from regulation as a hazardous waste, and collection programs in those states typically do not test the paint. Moreover, the common belief that latex paint is non-hazardous means that testing the paint is usually not even a question. For these reasons, most programs do not test latex at all.

However, a few have; and the results are sobering.

When testing to characterize latex is done, it has usually included EP Toxicity for metals. The EP Toxicity test is aimed at finding out how much various metals will leach out of the paint. Because of new EPA regulations, TCLP has recently replaced EP Toxicity.

The results of a survey of twelve paint recycling or disposal programs are described below.

PORTLAND, OREGON -- In 1988, Portland's Metropolitan Service District tested five composite samples of latex paint collected at its May 14 Household Hazardous Waste Day. None of the samples had been sorted to exclude hazardous components.

TABLE 4 summarizes the test results.

TABLE 4
PORTLAND METRO: E.P TOXICITY RESULTS

FIGURES ARE IN PPM (mg/l); "<" MEANS "LESS THAN".

	Sample One	Sample Two	Sample Three	Sample Four	Sample Five	MAX ALLOWED
BARIUM	<1	<1	<1	4	2	100
CADMIUM	<0.05	12	<0.05	<0.05	<0.05	1
CHROMIUM	0.2	<5	<0.1	0.3	<0.1	5
COPPER	0.15	4	0.2	0.26	0.15	NA
LEAD	<0.1	35	<0.1	12	0.2	5
MERCURY	<0.02	16	<0.02	0.3	0.2	0.2
NICKEL	0.08	25	0.05	0.2	0.1	NA
ZINC	1.7	37	6.6	55	12	NA

DATA SOURCE: May 11, 1988 Memorandum; Robin Smoot; Metropolitan Service District.

As shown in TABLE 4, three of the samples exceeded acceptable mercury limits. Two of these exceeded lead limits, and one of these also exceeded cadmium limits.

BAY AREA, CALIFORNIA -- One composite latex paint sample from a Bay Area collection site was tested for VOCs, while three other composite samples were tested for Total Metals (for chromium, lead and mercury). The samples were taken from 18 drums collected at a round-up. The paint was roughly sorted by color and bulked into drums, with 12 being light and 6 dark. Each sample is a composite of 6 drums. EP Toxicity has not been conducted -- instead, Total Metals were measured. TABLE 5 shows the results of the tests.

TABLE 5
BAY AREA TEST RESULTS

FIGURES ARE IN PPM (mg/l); "<" MEANS "LESS THAN".

COMPOUND	DARK COMPOSITE	WHITE-1 COMPOSITE	WHITE-2 COMPOSITE	MAX ALLOWED
TOTAL METALS				
CHROMIUM	<1.0	<1.0	<1.0	NOT LIMITED
LEAD	1070	214	183	NOT LIMITED
MERCURY	68.1	45.9	37.9	NOT LIMITED
VOC	COMPOSITE (identity not specified)			
	58.5			Not Furnished

DATA SOURCE: National Express Laboratories, Inc.; June 5, 1990.

We can extrapolate from Total Metals to what kind of EP Toxicity levels might have been measured. This is done by comparing the Bay Area Total Metals with another community which measured both Total Metals and EP Toxicity. For example, we can compare the Bay Area data with Seattle's Total Metals analysis. By using the proportion of EP Toxicity to Total Metals levels in the Seattle tests as a basis for speculating on EP Toxicity levels of the Bay Area test samples, we can conclude that the Bay Area sample might pass, but could exceed the EP Toxicity Limit for mercury by as much as a factor of two.

SAN DIEGO COUNTY, CALIFORNIA -- The County is doing testing now for VOC's and EP Toxicity. Results are still outstanding. However, in October of 1989 the County tested a latex paint sample that was a composite of ten barrels of paint. No tests were conducted to determine whether the paint was hazardous. However, San Diego did test for Volatile Organic Compounds (VOCs). TABLE 6 shows that latex paint can exceed local VOC limits.

TABLE 6
SAN DIEGO COUNTY: VOC TEST RESULTS

VOC LEVEL (g/l)	MAX ALLOWED (g/l)
292.1	250

DATA SOURCE: Calcoast Analytical-ITL; October 3, 1989.

THURSTON COUNTY, WASHINGTON -- Not all test results indicate latex is hazardous. The Thurston County Department of Environmental Health did tests on latex paint collected through a 1988 round-up program. A composite sample was taken from several randomly selected gallon-cans of leftover latex paint. The paint was tested wet for most of the EP Toxicity metals. The paint was dried and tested again.

As shown on the next page in TABLE 7, all metals were within acceptable limits [though mercury approached its limit]. However, given the small sample size, it is impossible to have confidence that these results are representative.

Many of the metals tested slightly lower in the dried paint samples. This reflect normal variance in lab test results, or may be because the physical and chemical changes caused by drying paint locks up the metals, and makes them less soluble.

TABLE 7
EP TOXICITY TEST RESULTS FROM
THURSTON CO. ENVIRONMENTAL HEALTH DEPARTMENT

FIGURES ARE IN PPM (mg/L); "<" MEANS "LESS THAN".

METAL	DRY PAINT	WET PAINT	MAX ALLOWED
ARSENIC	<0.2	<0.2	5.0
BARIUM	0.4	0.8	100
CADMIUM	<0.01	<0.01	1.0
CHROMIUM	<0.1	<0.1	5.0
LEAD	<0.1	<0.1	5.0
MERCURY	0.12	0.14	0.2
SELENIUM	0.2	0.3	1.0
SILVER	<0.1	<0.1	5.0

DATA SOURCE: Lancto Testing Laboratories, Inc.; January 6, 1989.

HENNEPIN COUNTY, MINNESOTA -- Greg Lie of Hennepin County reports that the average Total Metals mercury content of all latex paint collected is 15-30 ppm, probably too low to be hazardous. However, no lab reports were available to confirm this anecdotal information.

VENTURA COUNTY, CALIFORNIA -- The County is doing testing now for VOCs and EP Toxicity. Results are still outstanding.

SAN BERNARDINO COUNTY, CALIFORNIA -- No testing has been done on latex paint at this time.

SAFETY SPECIALISTS INC., CALIFORNIA -- This hazardous waste firm states it has only conducted durability tests on its recycled paint (using UV light exposure to duplicate the sun exposure). They do not report any EP Toxicity testing.

SEM INC., CALIFORNIA -- This firm, which reprocesses San Mateo County's latex paint, does testing of viscosity as part of its quality control. No testing is done to determine the paint's hazardous characteristics.

VERMONT PAINT SWAPS -- No testing has been done at this time.

POLLUTION SOLUTIONS INC., VERMONT -- This hazardous waste disposal company in Vermont handles household hazardous waste disposal for several agencies in the Northeast. Testing is done only where there is reason to suspect the presence of unusual

elements. So far they have only tested solvent-based paint for PCB's. No tests have been reported for latex.

SEATTLE, WASHINGTON -- Seattle has conducted extensive waste characterization tests on sorted leftover latex paint. A sorting protocol diverts significant volumes of lead-based and high-mercury latex paints. Characterization tests (EP Toxicity, Volatile Organics Analysis, and Base-Neutral-Acid Analysis) on successive batches show that the paint is consistently non-hazardous after sorting. EP Toxicity test results are displayed below in TABLE 8.

TABLE 8
ANALYSIS OF SORTED LATEX PAINT:
E.P. TOXICITY FOR METALS
(LIQUID PAINT)

	EP TOX MAX (mg/l)	HHW SHED (mg/l)	U/W (mg/l)	SHORELN (mg/l)	KENT (mg/l)
Arsenic	5.0	<0.1	<0.1	<0.1	<0.1
Barium	100.0	1.6	1.1	1.7	1.3
Cadmium	1.0	<0.1	<0.1	<0.1	<0.1
Chromium	5.0	<0.1	<0.1	<0.1	<0.1
Lead	5.0	1.9	0.1	<0.1	0.1
Mercury	0.2	<0.05	<0.05	<0.05	<0.05
Selenium	1.0	<0.1	<0.1	<0.1	<0.1
Silver	5.0	<0.1	<0.1	<0.1	<0.1
Copper	N.A.	0.1	0.1	0.1	0.2
Nickel	N.A.	<0.1	<0.1	<0.1	<0.1
Thallium	N.A.	<0.1	<0.1	<0.1	<0.1
Zinc	N.A.	6.7	4.25	2.0	4.8

SOURCE: City of Seattle; "Analysis of Latex Paint"; Sound Analytical Services, Inc.; December 20, 1989.

Enough lead and high-mercury paints are recovered to suggest that unsorted latex would likely be hazardous. However tests on unsorted paint have not been conducted to document this suspicion.

In summary, while only a few jurisdictions have tested leftover latex paint to determine whether or not it is hazardous, it appears that unsorted, latex paint is often a characteristic hazardous waste for heavy metals such as lead, mercury, and cadmium. San Diego also found that latex paint can exceed California limits for Volatile Organic Compounds, probably because of contamination by solvent-based paint. This reinforces the importance of a careful sorting protocol.

More jurisdictions should test latex paint to characterize it. Much of the latex paint now disposed in municipal landfills is likely hazardous, and may expose local jurisdictions to increased Superfund clean-up liability.

Over the next 10-15 years, leftover latex paint will likely become less hazardous, as old stocks of leftover lead and mercury-containing paints are finally cleared out and replaced by new, non-hazardous latex.

In the meantime, increased awareness of the environmental risk posed by leftover latex paint may cause more jurisdictions to accept latex through their household hazardous waste collection programs. In this case, more communities may turn to latex paint recycling as an environmentally-sound disposal alternative which can reduce disposal costs.

2. MERCURY

Many leftover latex paints contain mercuric biocides. The EPA estimates that 30% of newly manufactured interior latex paint contained phenyl mercuric acetate (PMA) just prior to its August 20, 1990 PMA ban. Substantially more exterior paints contained PMA. A higher percentage of old interior and exterior latexes contain PMA as well.

Mercuric fungicides like PMA were used to preserve latex paint in the can, and to prevent mildew from growing on the paint after application.

Recent EPA actions regarding mercuric biocides in latex paint have caused many to question the future of latex paint reuse or recycling efforts. The first issue is whether federal regulations allow leftover latex to be reused or recycled if it contains mercuric fungicides. As described below, the answer appears to be "yes".

A second issue is whether leftover latex, if reused or recycled for interior or exterior application, might pose a significant health threat, and what should be done to reduce it. Both issues are discussed below.

Until recently, mercuric biocides in latex paint have not been regulated. Instead, the paint industry has voluntarily been shifting toward non-mercuric fungicides.

In 1989, a Detroit-area family was exposed to toxic levels of mercury after painting their home's interior. The family's 4-year-old son developed acrodynia, a reaction to toxic levels of mercury in the body.

Their house had recently been involved in a fire, and had been repainted with a latex

containing excessive amounts of mercuric fungicides (mercury was present at 930 parts per million, three times the 300 ppm level which is the limit of what has generally been accepted in interior latex).

Concern over this incident triggered renewed efforts by the U.S. Environmental Protection Agency to regulate or otherwise reduce mercuric biocides in new latex paints.

On June 29, 1990, the U.S. EPA published a notice in the Federal Register entitled "Pesticide Products Containing Phenylmercury and Other Mercury Compounds; Receipt of Requests for Voluntary Cancellation and Amendments to Delete Uses."

In response to the Detroit incident and additional information on the health effects of mercuric fungicides, the EPA approached the four manufacturers of mercuric fungicides, and was able to convince them to voluntarily amend their FIFRA registrations for phenyl mercuric acetate (PMA), di(phenylmercuric) dodecenyl succinate (PMDS), phenylmercuric oleate (PMO) and 3-(chloromethoxy)propylmercuric acetate (CMPA), such that they may no longer be added to new interior latex paints.

PMA continues to be registered for use in exterior paint. EPA may seek a similar restriction for mercuric fungicides in exterior paint within the next two years.

EPA staff reports that the change in FIFRA registration only restricts new additions of mercuric fungicides to interior paint -- it has no direct impact on recycling old leftover latex which already contains mercuric fungicides.

Thus, according to the EPA, producing and marketing a recycled interior latex paint fully complies with the change in FIFRA registration for mercuric fungicides.

According to a recent news release by the agency,

> "EPA prefers that consumers use paints which do not contain mercury when painting indoor surfaces. To deal with existing stocks of paint containing mercury, the National Paint and Coatings Assn. is working with paint manufacturers to relabel all paints with higher mercury levels (over 200 parts per million) for exterior use only. **EPA believes that consumers may continue to use interior paint with lower mercury levels (200 part per million or less) without unreasonable risk if they follow all label directions, which include ventilating thoroughly during and after use and minimizing exposure to children.**" [emphasis added] (EPA news release; June 29, 1990; page 1).

For an on-going latex paint recycling program, EPA staff recommends that the label be modified to indicate that mercury is present and to emphasize proper precautions.

Thus, from a regulatory perspective, leftover latex paint can be reused or recycled as an exterior and interior paint.

Regardless of regulatory leeway, the question remains whether reusing or recycling leftover latex poses a potential health risk, and how this should be minimized.

So far, because of reduced exposure in exterior applications, there has been little suggestion that exterior recycled latex might pose a human health risk. Concern has been focused on interior applications, where vapor concentrations are higher.

EPA has published an Environmental Fact Sheet which summarizes some of the literature on the health risks of mercuric fungicides in latex paint.

The health risks by mercuric fungicides are posed when mercury vapor is formed. According to EPA's Environmental Fact Sheet, the lowest observed effects level is 25 $\mu g/m^3$ of mercury vapor in an 8-hour day. The chronic inhalation reference dose (RfD) for mercury vapor is 0.3 $\mu g/m^3$.

However, mercury vapor concentrations may remain above the inhalation (RfD) for months following painting.

During indoor painting, exposure levels from paints with 200 ppm mercury may reach 200 $\mu g/m^3$. The OSHA threshold limit value (TLV) for mercury vapor is 50 $\mu g/m^3$ with an OSHA ceiling level of 100 $\mu g/m3$.

Thus, interior paint with 200 ppm of mercury may exceed both the Rfd and the TLV ceilings. EPA notes that these ceilings may be even lower for children and fetuses.

This data argues that future recycling and reuse efforts should ensure paint for interior application falls well below 200 ppm of mercury. This can be accomplished by separating leftover interior and exterior latex as it is collected. Interior latexes contain lower fungicide levels. When batched together, mixed interior latex is likely to have a mercury reading below 60 ppm. The mixed exterior latex should be used for exterior applications only.

3. PCBs

A number of paint collection programs have found PCBs in leftover solvent-based paint. When present, PCBs preclude any effort to recycle the paint, or to blend it as an alternative fuel. The possibility of PCB contamination makes initiating a solvent-based paint recycling program seem too risky for many jurisdictions.

While this issue requires additional research, there is reason to believe it can be overcome. For years, the means by which PCBs could have been introduced into solvent-based paints has been a mystery.

Recently, one chemical supplier has suggested that PCBs may be a constituent of some marine and industrial specialty paints. Thus, by excluding these paints it may be possible to exclude PCBs as well.

While this has yet to be proven conclusively, two solvent-based paint collection programs -- in Seattle and San Bernardino -- have excluded these specialty paints and have tested negative for PCBs. (However, another Bay area program reports continued PCB contamination, even after segregating marine and industrial paints.)

4. MANUFACTURING CAPACITY

As noted earlier, latex paint blending programs manufacture a maintenance paint which contains only 10-20% of post-consumer latex paint. This means that a manufacturer can accept no more leftover paint than 20% of its total maintenance paint output.

Because of this, blending programs can quickly exceed the capacity of local paint manufacturers. This appears to be an inherent constraint on blending programs.

5. COOPERATION BETWEEN GOVERNMENT AND INDUSTRY

Many recycling programs -- e.g., blending programs and high-quality recycling programs -- depend on a constructive partnership between government and the paint industry.

State and local governments have a ready supply of leftover paint through their collection programs, and the paint industry has the knowledge and the facilities to reprocess it and to sell it. Working together, government and industry can solve a disposal problem and create a product with value.

Many paint companies actively support recycling efforts. However just as many feel threatened by the introduction of a recycled product. Until the industry as a whole can cooperate with the public sector, paint recycling efforts will be significantly constrained. More work must be done to forge an effective partnership.

Without this cooperation, local governments will be left with an expensive paint disposal problem; and the paint industry will likely be subject to increased regulation of its products.

Recent efforts by the Canadian Paint and Coatings Association, the Puget Sound Paint and Coatings Association, and the California Paint Task Force have begun to establish an effective partnership with government and its contractors.

The National Paint and Coatings Association has recently begun to address paint recycling through its Ad Hoc Household Hazardous Waste Committee.

Together, these efforts may be the beginning of effective cooperation between the public sector and the paint industry.

6. THE NEED TO ESTABLISH A PUBLIC SECTOR MARKET

There is no shortage in the supply of leftover paint available for recycling or reuse. To date, recycling and reuse efforts have been supply-driven. There has been more desire to supply paint for reuse or recycling than to actually reuse paint or purchase a recycled product.

By organizing collection programs, government is helping guarantee a supply of leftover paint. But recycling and reuse will not truly become viable until government also helps guarantee a demand. Government must become an active partner by procuring recycled and reusable paint products itself.

Together, federal, state and local government agencies can consume more recycled or reusable paint than will ever be produced. Not only will can our purchases launch a new, environmentally-sound product that cuts disposal costs, but agencies will save purchasing dollars as well: recycled paint can be cheaper than virgin paint.

Painting contractors and the public will not purchase large volumes of recycled latex paint until public agencies themselves demonstrate confidence in the paint by using it in large volume.

Paint recycling and reuse can become successful once we close the loop through our own public purchases. A concerted effort must be made to ensure federal, state, and local agency demand and purchase of recycled paint.

CONCLUSION

Leftover latex and solvent-based paint is the major constituent of household hazardous waste collected by state and local governments. Recycling and reusing this leftover paint is a viable means for reducing its disposal costs. As described in this paper, paint reuse and recycling programs -- though in their infancy -- have proven themselves, and are growing.

A false perception that latex paint is not hazardous has limited latex collection and recycling efforts. However, as more agencies begin testing latex to characterize it, interest in reuse and recycling programs will likely grow. Recent changes in the FIFRA permit for mercuric fungicides have also constrained latex reuse and recycling programs by placing their legality in doubt. However, the regulatory waters are clearing, leaving room for reuse and recycling programs to once again grow. Likewise the pall cast by PCB contamination may at last be lifting.

However, if paint reuse and recycling programs are to flourish, government must do two things: 1] actively work to form a partnership with the paint industry; and 2] close the loop by becoming a major procurer of recycled and reusable paint, not just a supplier.

By addressing these issues, reuse and recycling programs can become a widespread way to turn a costly waste disposal problem into a community asset.

EPA's Concerns Regarding Mercury in Paint

Susan Mooney
Office of Solid Waste, EPA

On June 29, 1990, EPA announced that the use of mercury compounds in indoor latex paint would be eliminated. Mercury compounds were used as a biocide in paints for two reasons: (1) to preserve the paint in the can by controlling microbial growth; and (2) to preserve the paint film from mildew attack after it has been applied to a surface. Mercury biocides were used in 25-30% of all interior latex paint.

EPA and the Center for Disease Control (CDC) examined the risks posed by mercury in paints. This examination was precipitated by a recent case of acrodynia (a rare form of childhood mercury poisoning) in a young boy in Michigan. Acrodynia is characterized by severe pain in the extremeties, pinkness and peeling of hands, feet, and nose, irritability, sweating, and a rapid heartbeat. The nervous system and the kidneys are other targets of mercury poisoning. Both EPA and the CDC determined that mercury used in indoor latex paint provided an inadequate margin of safety to painters and others occupying rooms during and after painting.

All existing stocks of mercury biocide must now bear new labels with language that allows use for exterior paint applications only, prohibits use in paints manufactured for interior use, requires a warning statement to be placed on newly manufactured exterior latex paint, and provides maximum allowable use rates.

Existing stocks of interior latex paint with mercury biocides may still be sold. EPA has asked the National Paints and Coatings Association to work with paint manufacturers to relabel all interior paints with higher than 200 ppm mercury for exterior use only. EPA believes that use of interior paints with less than 200 ppm mercury can occur without unreasonable risk as long as its used in a well-ventilated area and that children's exposure is minimized.

No action was taken regarding mercury use in exterior paint because of lack of data regarding risks. EPA has required current registrants of mercury biocides (i.e., mercury compounds used in exterior paints) to develop and submit data regarding exposure of professional painters (to include biological monitoring) and paint formulators. Once this data is received, EPA will determine whether further action is necessary regarding mercury biocide use in exterior paint.

EPA recommends that residents interested in disposing of their mercury-containing paint call their local or State solid

waste official to determine what programs (e.g., household hazardous waste collections, paint recycling, etc.) are available in their community. Residents can determine if their paint contains mercury by calling the paint maunfacturer, the toll-free national pesticide hotline number (provided in the attachments), their State agricultural office, or their EPA regional office.

Most household hazardous waste collection programs that accept latex paint try to recycle or reuse as much as possible. EPA supports this approach. Mercury-containing latex paint may be bulked, consolidated, and reused as long as no additional mercury has been added. The paint can be used for interior use if the mercury levels are below 200 ppm. If the levels are above 200 ppm, EPA recommends that the paint be labeled for exterior use only. EPA also recommends that EPA's Consumer Fact Sheet and Questions and Answers on Mercury in Paint (attached) be available to all participants.

If the paint cannot be reused or recycled, then EPA recommends (as it does for all houeshold hazardous waste) that the mercury-containing paint be treated as a regulated hazardous waste. For the latest recommended technologies for handling mercury-containg wastes, program sponsors should call the EPA regional office and work closely with the hazardous waste contractor. Technologies for recovering mercury are being researched now and may be available soon.

HOUSEHOLD HAZARDOUS WASTE

NPCA UPDATE

NOVEMBER 1990

Barbara Walz -- Manager Environmental Affairs

IT IS A PLEASURE TO BE HERE TO PRESENT THE PAINT INDUSTRY'S VIEWS ON THE ISSUE OF HOUSEHOLD HAZARDOUS WASTE MANAGEMENT. THIS ISSUE IS ONE IN WHICH THE PAINT INDUSTRY HAS BEEN VERY ACTIVE IN FOR NUMEROUS YEARS. AS AN INDUSTRY WE HAVE TAKEN SOME SIGNIFICANT STEPS IN THIS AREA AND ARE CONTINUING OUR EFFORTS TO PROVIDE GUIDANCE FOR THE MANAGEMENT OF HOUSEHOLD HAZARDOUS WASTES.

NPCA IS A VOLUNTARY NON-PROFIT TRADE ASSOCIATION COMPRISED OF APPROXIMATELY 700 MEMBER COMPANIES WHICH MANUFACTURE PAINT AND COATINGS AS WELL AS THE RAW MATERIALS USED IN THESE PRODUCTS. ALTHOUGH WE REPPESENT LARGE MANUFACTURERS AND SUPPLIERS, MANY OF OUR MEMBERS ARE SMALL BUSINESS OPERATIONS WHICH HAVE LESS THAN 30 EMPLOYEES. NPCA HAS APPROXIMATELY 20 COMMITTEES, COMPRISED OF MEMBERS, THAT ADDRESS VARIOUS HEALTH, SAFETY, ENVIRONMENTAL, TRANSPORTATION, LABELING, AND INFORMATION ISSUES. NPCA STAFF MONITORS FEDERAL AND STATE LEGISLATION AND REGULATIONS TO ASSIST MEMBERS IN KEEPING IN COMPLIANCE WITH OUR EVER CHANGING REQUIREMENTS.

SINCE LEFTOVER OR RESIDUAL CONSUMER PAINT PRODUCTS REPRESENT A MAJOR PORTION OF THE WASTES COLLECTED DURING HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS, THE ISSUE OF MANAGING HOUSEHOLD HAZARDOUS WASTE HAS BECOME IMPORTANT TO THE INDUSTRY.

IN THE SPRING OF 1987, NPCA FORMED AN AD HOC HOUSEHOLD HAZARDOUS WASTE COMMITTEE TO SPECIFICALLY ADDRESS WHAT THE PAINT INDUSTRY SHOULD DO TO RESPOND TO THE GROWING CONCERN OVER THE MANAGEMENT OF HOUSEHOLD HAZARDOUS WASTE. THE COMMITTEE CONSISTED OF REPRESENTATIVES FROM THE PAINT INDUSTRY WITH VARIOUS BACKGROUNDS. THIS GROUP WORKED CLOSELY WITH LOCAL AND STATE GOVERNMENTS,

ENVIRONMENTAL AND CONSUMER GROUPS AND EXPERTS ON THE MANAGEMENT OF HOUSEHOLD HAZARDOUS WASTES.

THIS COMMITTEE ACTIVELY PURSUED ITS GOALS, RESULTING IN THE DEVELOPMENT OF NPCA'S POLICY STATEMENT REGARDING HOUSEHOLD HAZARDOUS WASTE AND TAKING TWO MAJOR STEPS TOWARD REDUCING THE AMOUNT OF HOUSEHOLD PAINT WASTES AND EDUCATING CONSUMERS ON PROPER DISPOSAL METHODS OF RESIDUAL PAINT PRODUCTS.

THE FIRST ACCOMPLISHMENT WAS:
THE DEVELOPMENT OF A BROCHURE TITLED "PAINT DISPOSAL THE RIGHT WAY" THIS BROCHURE PROVIDES CONSUMERS WITH GENERAL DISPOSAL OPTIONS WHICH THEY CAN IMPLEMENT THEMSELVES IN ORDER TO REDUCE THEIR VOLUME OF PAINT WASTES. THE BROCHURE WAS MEANT TO BE USED AS AN EDUCATIONAL TOOL TO TEACH CONSUMERS PROPER PURCHASING AND DISPOSAL TECHNIQUES IN HOPES OF EVENTUALLY SEEING A REDUCTION IN THE VOLUME OF PAINT WASTE GENERATED.

THIS BROCHURE WAS MADE AVAILABLE, FREE OF CHARGE, TO ORGANIZATIONS REQUESTING COPIES. AVAILABILITY OF THE BROCHURE WAS ADVERTISED IN SEVERAL CONSUMER MAGAZINES. HUNDREDS OF THOUSANDS OF BROCHURES WERE DISTRIBUTED TO NUMEROUS ORGANIZATIONS INCLUDING THE LEAGUE OF WOMEN VOTERS, COMMUNITIES HOLDING COLLECTION DAYS AND RETAIL PAINT STORES. THE NATIONAL DECORATING PRODUCTS ASSOCIATION DISTRIBUTED THE BROCHURES TO RETAILERS THROUGH THEIR MEMBERS.

THE SECOND ACCOMPLISHMENT OF THE COMMITTEE WAS:
THE DEVELOPMENT AND ADOPTION OF VOLUNTARY NATIONWIDE DISPOSAL LABELING STATEMENTS. THIS PROJECT TOOK MUCH TIME AND EFFORT SINCE OUR OBJECTIVE WAS TO DEVELOP A DISPOSAL STATEMENT THAT WAS GENERIC SO THAT IT WOULD BE APPROPRIATE FOR EVERY STATE IN THE COUNTRY. NPCA ACTUALLY DEVELOPED TWO STATEMENTS, ONE FOR SOLVENT-BASED PAINT PRODUCTS AND A SECOND ONE FOR WATER-BASED

LATEX PAINT PRODUCTS BECAUSE THE TWO POSE DIFFERENT DISPOSAL PROBLEMS.

SOLVENT-BASED PAINT WASTES ARE IGNITABLE, AND THEREFORE FALL INTO THE RCRA DEFINITION OF HAZARDOUS. WHEN COLLECTED AND CONSOLIDATED IN LARGE AMOUNTS THESE HOUSEHOLD WASTES MUST BE MANAGED AS HAZARDOUS WASTES AND DISPOSED OF IN AN INCINERATOR OR USED IN SECONDARY FUELS PROGRAMS.

WATER-BASED PAINT WASTE, WHICH IS THE LARGEST VOLUME OF PAINT COLLECTED AT HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS, ARE NOT CONSIDERED HAZARDOUS UNDER FEDERAL RCRA RULES OR UNDER MOST STATE RULES. RECENTLY, IN COOPERATION WITH EPA, THE PAINT INDUSTRY VOLUNTEERED TO ELIMINATE MERCURY BIOCIDES FROM LATEX PAINTS INTENDED FOR INTERIOR USE. NPCA WILL BE REVISING THIS LABELING STATEMENT TO REFLECT MERCURY IN PAINT.

<u>THE STATEMENT FOR INCLUSION ON LABELS OF SOLVENT-BASED PAINT CONSUMER PRODUCTS READS</u>:
FOR DISPOSAL GUIDANCE OF UNUSED AMOUNT, CONTACT A HOUSEHOLD HAZARDOUS WASTE PROGRAM OR YOUR LOCAL OR STATE GOVERNMENT ENVIRONMENTAL CONTROL AGENCY.

<u>THE STATEMENT FOR LATEX-BASED PAINT PRODUCTS IS</u>:
FOR DISPOSAL GUIDANCE OF UNUSED AMOUNT, CONTACT YOUR HOUSEHOLD REFUSE COLLECTION SERVICE OR YOUR LOCAL OR STATE GOVERNMENT ENVIRONMENTAL CONTROL AGENCY.

AGAIN THE EMPHASIS IS TO DIRECT THE CONSUMER TO THE APPROPRIATE AGENCY OR SERVICE WITHIN THEIR STATE WHICH IS IN A POSITION TO ADVISE THE PUBLIC ON PROPER DISPOSAL IN THEIR STATE.

BOTH OF THESE STATEMENTS ARE CURRENTLY VOLUNTARILY USED BY MANUFACTURERS ACROSS THE UNITED STATES.

IN APRIL OF THIS YEAR, FOR EARTH DAY 1990, THE NPCA COMMUNICATIONS COMMITTEE REVISED THE PAINT DISPOSAL BROCHURE AND CIRCULATED AN EDITORS DESK ARTICLE ON DISPOSAL OF RESIDUAL PAINT TO 260 NEWSPAPERS NATIONWIDE. I HAVE SEVERAL COPIES OF THIS ARTICLE WITH ME IF ANYONE WOULD LIKE ONE, PLEASE PICK ONE UP AFTER THIS SESSION.

AGAIN, THIS ARTICLE EMPHASIS CAREFUL MEASUREMENT TO ESTIMATE THE CORRECT AMOUNT OF PAINT NEEDED AS WELL AS PROPER DISPOSAL TECHNIQUES FOR LATEX AND SOLVENT BASED PAINTS.

NPCA STRONGLY BELIEVES THAT THE BEST WAY TO REDUCE THE AMOUNT OF WASTE OR RESIDUAL PAINT IS TO PREVENT GENERATION OF THE WASTE. AS WE ALL KNOW, POLLUTION PREVENTION IS THE BUZZWORD FOR THE 90'S. THE KEY TO POLLUTION PREVENTION IS EDUCATION. SPECIFICALLY, THE PUBLIC NEEDS TO BE EDUCATED ON WAYS IN WHICH THEY CAN REDUCE THE VOLUME OF PAINT WASTE GENERATED. BY ACCURATELY ESTIMATING THE AMOUNT OF PAINT NEEDED, LESS PAINT WILL BE LEFTOVER, HENCE, LESS WASTE GENERATED.

THE EDITORS DESK ARTICLE ALSO MENTIONS THE FACT THAT SEVERAL FACILITIES ARE INVESTIGATING OR HAVE BECOME INVOLVED IN RECYCLING CONSUMER RESIDUAL PAINT PRODUCTS.

BEFORE DISCUSSING THE RECYCLING OF PAINT PRODUCTS, LETS TAKE A CLOSER LOOK AT THE TYPES AND AMOUNTS OF PAINT USED BY CONSUMERS.

IN 1989, U.S. CONSUMPTION OF PAINT AND COATINGS WAS APPROXIMATELY 1.04 BILLION GALLONS OF PAINT. OF THIS 1.04 BILLION GALLONS, 48% (493 MILLION GALLONS) ARE ARCHITECTURAL COATINGS. ARCHITECTURAL COATINGS ARE COATINGS THAT ARE FORMULATED FOR USE ON NEW AND EXISTING RESIDENTIAL, COMMERCIAL INSTITUTIONAL AND INDUSTRIAL STRUCTURES. ARCHITECTURAL COATINGS CAN BE BROADLY CLASSIFIED AS INTERIOR AND EXTERIOR PAINTS BOTH OF WHICH INCLUDE WATER BASED LATEX AND SOLVENT BASED FORMULATION. OF THE 493 MILLION GALLONS

OF ARCHITECTURAL COATINGS USED LAST YEAR, 200 MILLION (OR 41%) WAS USED BY RESIDENTIAL DO-IT-YOURSELF PAINTERS. IN 1989, THE MARKET CONSISTED OF 75% WATER-BASED AND 25% SOLVENT-BASED. KEEPING IN MIND THE TYPES AND AMOUNTS OF PAINT USED BY CONSUMERS, LETS TALK ABOUT RECYCLING.

RECYCLING TRADITIONALLY DEALS WITH A BASIC RAW MATERIAL FOR WHICH THERE IS A PROVEN RECOVERY METHOD AND A DEFINITE MARKET FOR THE RECYCLED COMMODITY.

IN RECENT YEARS, RECYCLING AND REUSE OF INDUSTRIAL AND CONSUMER WASTES SUCH AS USED OIL, SPENT SOLVENTS, ALUMINUM, GLASS, PAPER, PLASTIC AND NEWSPRINT HAS RECEIVED MUCH ATTENTION AND PROVEN TO BE A VALUABLE WASTE MANAGEMENT PRACTICE.

IN THE PAST SEVERAL YEARS, A NUMBER OF PROJECTS HAVE BEEN INITIATED TO RECYCLE CONSUMER PAINT RESIDUALS. THESE ACTIVITIES HAVE FOCUSED ON LATEX-BASED PRODUCTS. MOST OF THESE PROJECTS ARE STILL IN THE DEVELOPMENTAL OR TESTING PHASES.

IN THEORY, THE RECYCLING OF CONSUMER PAINT PRODUCTS WOULD HELP RESOLVE THE DISPOSAL PROBLEMS OPERATORS OF HOUSEHOLD COLLECTION PROGRAMS FACE AND COULD HELP MINIMIZE THE LANDFILL CAPACITY PROBLEM.

HOWEVER, IN REALITY, WE NEED TO BE AWARE OF THE OBSTACLES THAT EXIST IN RECYCLING PAINT PRODUCTS.

RECYCLING OF PAINT IS MUCH DIFFERENT THAN RECYCLING THESE BASIC COMMODITIES.

PAINT IS A COMPLEX CHEMICAL MIXTURE OF RESINS, SOLVENTS, PIGMENTS AND ADDITIVES THAT HAS BEEN FORMULATED TO MEET SET STANDARDS AND PROPERTIES. THESE CONSUMER PAINT PRODUCTS ARE MANUFACTURED BASED ON WELL RESEARCHED FORMULATIONS WHICH ARE DESIGNED TO PROVIDE

QUALITY PERFORMANCE, SUCH AS DURABILITY, WASHABILITY, GLOSS, COLOR RETENTION AND ADHESION. TO CONSISTENTLY OBTAIN THE DESIRED PROPERTIES, MANUFACTURERS MUST USE RAW MATERIALS OF KNOWN QUALITY.

CONSUMER PAINT RESIDUALS ARE NOT A RELIABLE SOURCE OF RAW MATERIAL. EXPERIENCE HAS PROVEN THAT PEOPLE HAVE A TENDENCY TO DISPOSE OF FOREIGN MATERIALS (SUCH AS PESTICIDES, USED MOTOR OIL, OR SOLIDS) INTO OPEN OR PARTIALLY USED PAINT CANS. THESE CONTAMINATED PAINT CANS ARE THEN COLLECTED AT A HOUSEHOLD COLLECTION PROGRAM AND ARE NOT SUITABLE FOR RECYCLING. THE USE OF RAW MATERIALS OF UNKNOWN QUALITY WILL COMPROMISE THE PERFORMANCE OF A PAINT PRODUCT AND WILL RESULT IN THE MANUFACTURE OF AN INFERIOR OR LOWER QUALITY PRODUCT THAT IS NOT ACCEPTABLE IN TODAY'S MARKET.

THERE IS NO GUARANTEE THAT CONSOLIDATED CONSUMER PAINT RESIDUALS, WHICH ARE COLLECTED AT HOUSEHOLD COLLECTION SITES, ARE NOT CONTAMINATED WITH FOREIGN OR TOXIC MATERIALS.

EVEN IF YOU TEST EVERY CAN, WHICH WOULD BE COST PROHIBITIVE, BARRIERS STILL EXIST BECAUSE THERE ARE HUNDREDS OF DIFFERENT PRODUCTS AVAILABLE TODAY AND THE FORMULATION FOR THESE PRODUCTS VARY FROM AMONG MANUFACTURERS AND PRODUCTS WITH MANY OF THE PRODUCTS BEING INCOMPATIBLE DUE TO THE UNIQUE COMPOSITIONS. THE RESULTING PRODUCT WOULD HAVE A LIMITED RANGE OF PROPERTIES AND THUS A LIMITED END USE.

RECYCLING OF PAINT PRODUCTS FACES THESE NOTED TECHNICAL BARRIERS AS WELL AS A NUMBER OF REGULATORY, LEGAL AND ECONOMIC OBSTACLES THAT ARE NOT PRESENT IN THE TRADITIONAL RECYCLING SITUATION, AS MANY OF YOU HAVE PERSONALLY EXPERIENCED.

NPCA IS CONCERNED WITH CURRENT VOLUMES OF HOUSEHOLD WASTE PAINT PRODUCTS AND THE DISPOSAL PROBLEM THESE WASTES POSE.

NPCA BELIEVES THAT THE MANAGEMENT OF RESIDUAL PAINT MUST BE ADDRESSED FROM VARIOUS AVENUES INCLUDING:

1. PROPER PURCHASING TECHNIQUES TO REDUCE THE VOLUME OF RESIDUAL PAINT GENERATED.
2. PAINT EXCHANGE PROGRAMS WHERE LEFTOVER PAINT CAN BE OBTAINED FOR FURTHER USE.
3. DONATION OF WASTE PAINT TO CHARITIES, COMMUNITIES, AND NEEDY FAMILIES AND ORGANIZATIONS.
4. PROPER DISPOSAL OF WASTE PAINT.
5. EVALUATION OF THE FEASIBILITY OF RECYCLING PAINT.

NPCA HAS RESTRUCTURED ITS AD HOC HOUSEHOLD HAZARDOUS WASTE COMMITTEE. THE COMMITTEE CONSISTS OF REPRESENTATIVES FROM OUR HEALTH AND SAFETY, WASTE MANAGEMENT, TRADE SALES, LABELING, AND INDUSTRY SUPPLIERS COMMITTEES.

WITH A BROAD VARIETY OF TECHNICAL, SAFETY, WASTE, LABELING AND MARKETING PROFESSIONALS WE BELIEVE WE CAN COMPREHENSIVELY EVALUATE THE MANAGEMENT OF CONSUMER RESIDUAL PAINT PRODUCTS INCLUDING THE FEASIBILITY OF RECYCLING CONSUMER RESIDUAL PAINTS. THIS COMMITTEE WILL BE VERY ACTIVE IN PURSUING ITS GOALS WHICH INCLUDE:

1. TO REDUCE THE VOLUME OF WASTE HOUSEHOLD PAINT AND ITS CONTAINERS WHICH MUST BE DISPOSED OF THROUGH INCINERATION AND/OR LANDFILL.
2. TO LOWER THE FINANCIAL BURDEN ON ALL LEVELS OF GOVERNMENT WHICH NOW MUST ASSUME RESPONSIBILITY FOR THE DISPOSAL OF WASTE PAINT AND ITS CONTAINERS.
3. TO EVALUATE EXISTING PAINT RECYCLING PROGRAMS.
4. TO ADDRESS EXISTING TECHNICAL, REGULATORY, LEGAL AND ECONOMIC BARRIERS TO RECYCLING OF PAINT PRODUCTS.

THIS COMMITTEE WILL ALSO BE RE-EVALUATING AND REVISING NPCA'S POLICY STATEMENT REGARDING HOUSEHOLD HAZARDOUS WASTES.

NPCA HAS ALSO BEEN WORKING WITH THE CALIFORNIA PAINT TASK FORCE IN ITS EFFORTS TO EXPLORE BARRIERS AND CONCERNS THAT PREVENT MANUFACTURERS FROM RECYCLING PAINT COLLECTED THROUGH HOUSEHOLD HAZARDOUS WASTE COMMUNITY COLLECTION PROGRAMS. NPCA WILL CONTINUE ITS EFFORTS WITH THE TASK FORCE.

1990 BROUGHT MANY NEW ENVIRONMENTAL CHALLENGES WITH IT. THROUGHOUT THIS YEAR NPCA HAS FOCUSED ON SEVERAL PROJECTS INCLUDING THE REAUTHORIZATION OF THE CLEAN AIR ACT AND THE DEVELOPMENT OF A PAINT INDUSTRY POLLUTION PREVENTION PROGRAM.

IN PRACTICE, THE PAINT INDUSTRY HAS BEEN A LEADER IN THE IMPLEMENTATION OF ON-SITE WASTE MINIMIZATION PROGRAMS, SUCH AS RECYCLING, RECLAMATION, AND SOURCE REDUCTION OF PRODUCTION WASTES. NPCA'S POLLUTION PREVENTION PROGRAM PROMOTES SOURCE REDUCTION WITH AN ADDITIONAL GOAL OF DEVELOPING AN ENHANCED PHILOSOPHY OF RESPONSIBLE ENVIRONMENTAL MANAGEMENT IN THE PAINT INDUSTRY.

1991 WILL OF COURSE BRING MORE ENVIRONMENTAL CHALLENGES TO INDUSTRY. NPCA HAS SET GOALS TO BECOME VERY ACTIVE IN THE REAUTHORIZATION OF RCRA AND THE EVALUATION OF THE HOUSEHOLD HAZARDOUS WASTE ISSUE.

IT WAS A PLEASURE TO BE HERS TODAY. I LOOK FORWARD TO WORKING WITH MANY OF YOU IN THE FUTURE.

GENERAL DISPOSAL OPTIONS FOR LATEX AND SOLVENT-BASED PAINT PRODUCTS

When Purchasing Paint remember to estimate the proper amount needed for the job. Buy only what you need. Ask your retailer for assistance.

Always be sure to read the label which contains important information regarding the product.

The Easiest way for you to dispose of leftover paint is to use it all up. Apply a second coat or touch-up areas which need improvement.

Leftover Paint can be given to someone who has a need for the product. Contact neighbors, friends, relatives, churches, theatrical groups, high schools, recreation departments or community service organizations. Many of these groups are pleased to accept "free" paint. Make sure that any product you donate is in its original container with the label intact.

Latex Paints can be left to dry by removing the lid and allowing the leftover product to dry. This should be done in an area which is away from children and animals. Allow the remaining paint to dry completely. In most states the container can then be disposed of in your household trash. Leave the lid off the can so that your household refuse hauler can see that the paint is hardened.

Solvent-based Paints (also known as alkyd or oil-based) require special disposal practices. Solvent-based paints are ignitable and present particular hazards. These products should **not** be disposed of down storm sewers, household drains (especially if you have a septic tank), or on the ground.

Solvent-based Paints (also known as alkyd or oil-based) should be disposed of as a household hazardous waste. Hold for a "Household Hazardous Waste Collection Day." If your community does not have a household hazardous waste program, contact your local or state government environmental control agency for disposal guidance.

Paint Thinners, turpentine, mineral spirits and solvents should **not** be poured down a drain or storm sewer. With a few simple steps, you can reuse these types of products. Let used turpentine or brush cleaners sit in a closed container until the paint particles settle out. Then pour off the clear liquid which can be reused. Add an absorbent (i.e. cat litter) to the remaining residue and let it ***dry completely***. Contact your household refuse collection service, a household hazardous waste program, or local or state government environmental control agency for guidance on disposal.

VOLUNTARY DISPOSAL
LABELING STATEMENTS

A. SOLVENT-BASED PAINT:

FOR DISPOSAL GUIDANCE OF UNUSED AMOUNT, CONTACT A HOUSEHOLD HAZARDOUS WASTE PROGRAM OR YOUR LOCAL OR STATE GOVERNMENT ENVIRONMENTAL CONTROL AGENCY.

B. LATEX-BASED PAINT:

FOR DISPOSAL GUIDANCE OF UNUSED AMOUNT, CONTACT YOUR HOUSEHOLD REFUSE COLLECTION SERVICE OR YOUR LOCAL OR STATE GOVERNMENT ENVIRONMENTAL CONTROL AGENCY.

GOALS FOR NPCA
AD HOC HOUSEHOLD HAZARDOUS WASTE COMMITTEE

1. TO REDUCE THE VOLUME OF WASTE HOUSEHOLD PAINT AND ITS CONTAINERS WHICH MUST BE DISPOSED OF THROUGH INCINERATION AND/OR LANDFILL.

2. TO LOWER THE FINANCIAL BURDEN ON ALL LEVELS OF GOVERNMENT WHICH NOW MUST ASSUME RESPONSIBILITY FOR THE DISPOSAL OF WASTE PAINT AND ITS CONTAINERS.

3. TO EVALUATE EXISTING PAINT RECYCLING PROGRAMS.

4. TO ADDRESS EXISTING TECHNICAL, REGULATORY, LEGAL AND ECONOMIC BARRIERS TO RECYCLING OF PAINT PRODUCTS.

PAINT - California Paint Task Force

Stephen S. Depetris
Dufour Environmental & Resource Management

Presentation

As Director of Research and Environmental Affairs for a national specialty coatings company located in California, I witnessed over the last 8 years an incredible growth in regulations affecting the paint industry. Regulations on air quality, water quality, hazardous materials, community right-to-know, worker right-to-know, hazardous waste, underground storage tanks, etc. have all been implemented or considerably strengthened over the last 8 years. Now as a consultant specializing in helping California companies deal with the ever increasing amount of environmentally related regulations, I'm finding more and more companies adopting a "siege" mentality; i.e. what's next? Well, what's next turned out to be household hazardous waste, in particular the paint component of household hazardous waste.

Normally, paint companies are in a reactive mode, reacting as best as they can to regulations after they are implemented. The household hazardous waste issue, since it is not amenable to a "quick-fix", i.e. a legislative or regulatory solution, seemed to be ideal for a proactive response. The paint industry saw in the California Paint Task Force a way they could proactively work with the government to deal with a serious issue that was on its way to becoming a serious problem. Thus, a wary group of paint company representatives met with the other members of the Task Force in the first meeting of the California Paint Task Force on December 11, 1989 in San Francisco to begin work on finding ways to deal with the paint component of household hazardous waste.

The Paint Task Force is made up of representatives from:

1. Paint manufacturers whose products are sold to California consumers. Manufacturers involved include both regional and national companies.

2. The National Paint and Coatings Association (NPCA), the national organization based in Washington, D.C. representing the paint industry.

3. Companies providing solid waste collection services.

4. City and county agencies concerned with household hazardous waste, especially the paint component of household hazardous waste.

5. State agencies with various concerns. These include the California Integrated Waste Management Board (CIWMB), the Department of Health Services (DHS), who enforce regulations regarding the treatment of hazardous waste (which includes recycling), Department of General Services (DGS), who must deal with state requirements

mandating the purchase of recycled products, and others.

6. Non-profit organizations interested in the household hazardous waste issue.

7. Federal agencies with various concerns. In particular, the General Services Administration (GSA) who is interested in purchasing recycled paint.

During the first year of the Paint Task Force, two possible approaches for dealing with paint were developed. The first approach is to use the California State Prison System. Prisoners could be involved in the collection and sorting efforts; they also could actually handle the processing and recycling of the paint since the equipment needs would not be excessive. It is very likely that much of the paint used in government buildings throughout the state could be supplied at a relatively low cost from such a prison paint recycling program. Currently, the Prison Industry Authority is studying the feasibility of such a program which might consist of a cooperative effort with a community facility sited near an appropriate institution.

The other possible solution to the problem of what to do with paint collected in household hazardous waste collection programs is to have paint companies process/recycle it into sellable paint. From the very start of the Paint Task Force, industry representatives identified critical issues that had to be addressed before this could be considered a viable solution. I would like to identify these issues and describe how the Paint Task Force dealt with them. Please note that some of the progress described in the following sections was not directly attributable to the Paint Task Force; however, I would like to think that the dialogue established by the Task Force at least contributed to the progress.

1. <u>Economic Incentives/Establishment of a Market</u>

Issue The best possible program encourages companies to get into the business of recycling paint by providing economic incentives. The best possible incentive is the presence of a market. Things always work best when companies are allowed to find a need and then fill it.

The government itself is the best customer for recycled paint. Currently, the State of California buys about 90,000 gallons/year of paint. Thus, through the combination of revised specifications, bid preferences, and gentle persuasion, the government can go a long way to establishing a market itself.

Additionally, the government can use other economic incentives, such as tax credits and/or grants, to encourage companies to voluntarily recycle paint.

Progress Considerable progress was made in establishing a market for recycled paint. Much of this was due to the fact that a bill had already been enacted into law requiring the state to purchase recycled products. This bill, Assembly Bill 4, chaptered on 9/30/89, specified that:

> Procuring agencies procuring or purchasing materials, goods, or supplies shall give a purchasing preference to recycled products when all of the following apply:
>
> 1. The product meets applicable standards.
>
> 2. The product can be substituted for a comparable nonrecycled product.
>
> 3. The product costs no more than a comparable nonrecycled product.
>
> The department shall set the following goals for purchases made by procuring agencies:
>
> 1. By January 1, 1991, at least 10 percent of state purchases are of recycled products.
>
> 2. By January 1, 1993, at least 20 percent of state purchases are of recycled products.
>
> 3. By January 1, 1995, at least 40 percent of state purchases are of recycled products.

The bill defines "Department" as the Department of General Services, "Procuring Agency" as the "Department of General Services and any other state department or agency having delegated procurement authority granted pursuant to Section 10333 with an annual total dollar limit above one million dollars". The recycled products discussed in the bill include "Solvents and paint, including water-based paint" among others (compost and co-compost products, glass, oil, plastic and tires).

By January 1, 1995, at least 40% of the products listed above purchased by the Department of General Services will be supplied as recycled products. Assuming the quality of the recycled paint is acceptable, DGS would like to buy as much recycled paint as possible to ensure meeting the 40% guideline. The potential market for recycled paint, approximately 40,000 gallons/year (if not more), is impressive. Additionally, since the recycling of solvent-based paint is not currently feasible (due to possible problems with VOC restrictions and hazardous

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ingredients), most of the recycled paint will be water-based.

Additional progress in this area reflected the efforts by the Department of General Services to develop modified specifications allowing for the purchase of recycled paint; also, DGS is attempting to develop specific applications and users for which recycled paint would be acceptable.

The CIWMB is also getting involved in this area. The Markets Development Branch of the CIWMB is divided into the following three sections, each section addressing this issue in a different way:

1. The Recycling Markets Development Zones Section is encouraging local jurisdictions to provide market zones similar to economic development zones. These zones would give recycling manufacturers regulatory incentives (relaxation of building codes, zoning laws, and permitting processes) and/or tax incentives.

2. The Recycling Investment Tax Credit Section is administering the program created by Assembly Bill 1308. This program allows a 40% tax credit as an offset against the cost of equipment purchased for recycling secondary materials. Such secondary materials may include water-based paint.

3. The Recycled Products Procurement Section is working with state and local procurement agencies to established bid preferences for recycled goods, including paint.

These items all are excellent examples of what the legislature and state agencies can do to help establish potential markets for recycled paint.

2. <u>Quality/Market Perception</u>

Issue This goes hand in hand with establishing a market. Part of establishing a market for recycled paint is convincing that market that the paint is acceptable in quality, application properties, and durability. The better the convincing, the larger the market.

Progress The best way to determine the quality of recycled paint is independent laboratory and field testing (as all paint companies have done for years with their own products). Field testing of recycled paint was started this year

under the auspices of the Department of General Services who arranged to have a contractor paint the exterior of two state buildings on the Cal Expo site in Sacramento, California with recycled paint supplied by Major Paint, Torrance. The paint was found to have acceptable application properties; durability is still undetermined. The next demonstration project is another building on the Cal Expo site; this building, much more visible to the public, is scheduled to be painted with recycled paint in 1991.

Independent testing can be done by private laboratories specializing in paint. In California, another option is to have the performance testing done in the state college system. Specifically, California Polytechnic State University in San Luis Obispo is setting up a Coatings Technology program within the Chemistry department. The Paint Task Force is working with Cal Poly to find a way to have the testing done in the university laboratories. Studies comparing recycled paint with nonrecycled paint would help convince potential customers of the acceptable quality of recycled paint (assuming, of course, that the recycled paint met minimum industry standards).

Cal Poly is also looking into the feasibility of recycling solvent-based paint.

3. Regulatory Barriers

Issue Assuming a market for recycled paint has been established, the government must do everything possible to eliminate regulatory barriers preventing companies from manufacturing recycled paint. Paint companies will comply with all existing federal, state, and local regulations since they already do so in their current operations; however, if recycling will mean that the company is faced with additional regulations or more "red tape", most companies will decide that it isn't worth it. The best example of this in California is that most paint companies couldn't manufacture recycled paint today even if they wanted to. Under current Department of Health Services regulations, paint companies working with recycled paint from outside their company could become Treatment, Storage, and Disposal Facilities (TSDF). The necessary permits combined with the potential penalties for non-compliance present an obstacle most companies would rather not deal with.

Progress Progress in this area was based primarily on legislative initiative, which, because of existing state regulations, may be the only way it can happen.

Assembly Bill 2597, chaptered on 9/25/90, allows latex paint to be collected without being subject to permit requirements under the following conditions:

1. The collection facility accepts only latex paint, used oil, antifreeze, spent lead-acid batteries, nickel-cadmium, alkaline, carbon-zinc, and other small batteries. No other hazardous wastes, other than these, can be received and handled by the facility.

2. The materials are transported to the facility by the generator.

3. The latex paint, antifreeze, and small batteries transported to the facility at any one time do not exceed a total volume of 5 gallons for any single container or 20 gallons total for the shipment.

4. The materials are not stored longer than 180 days.

5. The material collected must be managed in accordance with hazardous waste labelling, containerization, emergency response and training requirements.

Assembly Bill 2834, chaptered on September 30, 1990, allows paint manufacturers and others to take paint as long as it is used or reused as an ingredient in an industrial process to make a product, or used/reused as a safe and effective substitute for commercial products. The bill specifies that treatment of the recycled material is limited to the following operations:

1. Filtering
2. Screening
3. Sorting
4. Sieving
5. Grinding
6. Physical or gravity separation, without using a chemical additive or external heat
7. PH adjustment
8. Viscosity adjustment

The bill also defines additional requirements for the labeling and handling of this material.

Both of these bills are an excellent start at eliminating regulatory barriers that keep companies from manufacturing recycled paint.

4. Liability/Unknown Hazardous Ingredients

Issue Paint companies are legitimately concerned with the possibility of "contaminated" paint coming into their facility for recycling. This paint, if the contaminant is unknown and hazardous could result in the company violating worker right-to-know, community right-to-know, hazardous waste, water quality, and other laws. The potential resultant liability is frightening.

Additionally, there is a liability relating to product quality. Who would be responsible for those instances where the recycled paint does not meet user expectations?

Progress An area where progress is still needed. The problem of identifying possible contaminants in paint collected for recycling can be addressed through sampling. The California Paint Task Force is working with California Polytechnic State University to develop protocols for sorting, consolidating and testing. Again, much, if not all, of the testing could be done by the laboratory at Cal Poly.

Still to be resolved are the liability issues. Who will assume liability for the possible presence of contaminants in collected paint and who will accept the liability for the performance of the recycled paint?

The California Paint Task Force accomplished much during its first year of operation. The most important thing it accomplished was the establishment of a dialogue between paint manufacturers, local and state agencies, and the legislature. Each party made a strong effort to understand the needs and concerns of the other parties: the Legislature understood and addressed many of the concerns of the paint manufacturers; in return, the paint manufacturers have come to an understanding of the Legislature's concern for the ever increasing volume of paint being collected in household hazardous waste collection programs. The considerable progress made in one year by the California Paint Task Force should serve as an excellent example to anyone looking for the best way government and industry can work together to address common problems.

Thank-you for allowing me to speak today.

COMPREHENSIVE HOUSEHOLD HAZARDOUS WASTE EDUCATION: MINNESOTA'S PROGRAM

Elizabeth Gelbmann, Minnesota Pollution Control Agency (MPCA)

In 1989, the Minnesota Legislature passed a comprehensive waste reduction and recycling law, which provides funding to Minnesota's 87 counties for a variety of solid waste activities, including household hazardous waste. Under that law, each Minnesota county is required to provide a broad-based public education program on household hazardous waste and waste reduction.

Education has been an important part of the MPCA's household hazardous waste program. The focus on education resulted from the MPCA's experience with the "model community" project in 1987, a year-long public awareness and education program, culminating in a one-day collection. Based on that project, the MPCA learned that with education, waste reduction occurs and fewer wastes are dropped off for disposal at the collection site.

Currently, in the MPCA's seven regional household hazardous waste programs, education and waste reduction activities are required under the contract between the MPCA and the host county. Flexibility in providing education at the local level is essential and counties are encouraged to tailor their individual programs to the local needs and resources. However, the MPCA provides a framework for conducting the education program.

Planning an Education Program

Counties participating in the MPCA's program plan their education and waste reduction program using a committee process. The Committee, composed of community leaders including solid waste officers, teachers, extension agents, solid waste disposal facility representatives, public members and others, are charged with developing an education plan and assisting in implementing education activities. Although the goal of this system is to develop education programs to meet the needs and resources of the communities served, certain criteria are required to be met in each plan.

Individual county plans must focus on certain essential messages so that similar educational messages are being delivered across the state. The messages delivered must focus on identification of the wastes and awareness of the problems posed by the wastes, proper management of wastes and waste reduction. And, in order to reach the broadest possible audience in the county, the messages must be delivered using a variety of educational tools. County education plans must demonstrate that messages are being delivered through use of the news media, the formal education (school) network,

Messages:

- **Identifying HHW**
- **Awareness of Problems Related to HHW**
- **Reducing HHW**
  - **Reuse, recycle**
  - **Home treatment/disposal**
  - **Careful purchasing, storing**
  - **Use of alternatives**

Use a Variety of Techniques:

- **Formal education (school)**
  - **Classroom activities**
  - **Speakers**
  - **Teacher education**
- **News media**
  - **News articles**
  - **Columns**
  - **Ads, PSAs**
- **Direct information**
  - **Hotline for disposal advice**
  - **Speakers Bureau**
  - **Direct mail**
  - **Information Availability**

Local Program Education Plans
Committee Membership

- ❑ **County Solid Waste representative***
- ❑ **Extension Agent***
- ❑ **Teacher***
- ❑ **Solid Waste Facility representative***
- ❑ **Public Member***

- ❑ **County Board/other official**
- ❑ **Environmental Activist**
- ❑ **DNR official**
- ❑ **Librarian**
- ❑ **League of Women Voters**
- ❑ **Civic leader**
- ❑ **News Media representative**

and through direct provision of information (speaker's bureaus, exhibits in public places, direct mail, hotlines to provide disposal advice, etc.). Many of the materials used in the county plans are provided by the MPCA, others are developed by the counties.

Education in Practice

By allowing and encouraging local counties to develop their own education programs, with certain guidelines, numerous creative and innovative ideas have emerged at the local level. Some of the counties have developed advertising campaigns with logos and slogans. One program has instituted a recognizable household hazardous waste "character," who appears on posters, news media ads and in-person at events, educating the community about household hazardous waste.

Other counties have worked extensively with teachers and the education community on the issue of household hazardous waste. County coordinators regularly conduct teacher workshops on the issue, speak to classrooms and develop programs for school groups. Because the education program is being planned and delivered at the local level, the MPCA's county coordinators are in a good position to reach the teachers in their counties and to work with them to provide education in the schools.

School Activities

Early in the MPCA's household hazardous waste program, we realized that materials were needed to work with the schools. Based on discussions with educators, the MPCA learned that teachers were extremely interested in environmental issues, and were looking for activities for their students. Teachers expressed a need for activities that could be easily incorporated into the classroom routine, would allow students to work and learn independently, would be self contained and self teaching, and would provide students with a hands-on activity.

At that time, working cooperatively with the Minnesota Environmental Education Board, the development of household hazardous waste learning stations began. The Environmental Education Board had already developed learning stations for other natural resource issues, and were eager to work with the MPCA on a set for household hazardous waste. The completed learning stations were a series of student "hands-on" activities on household hazardous waste, and provided teachers with an easy way to incorporate household hazardous waste and solid waste issues into their teaching day.

The original learning stations were used extensively in fourth through sixth grade classrooms around Minnesota. After several years of use, the MPCA conducted surveys and focus groups of teachers to find out how the learning stations had been received. The overwhelming response from these teachers was that the stations were successful with students and had met the requirements of teachers.

From the teacher input, some changes were made to the content of the learning stations. Some of the questions were revised to make them more understandable or to make them easier for the students to answer. The MPCA revised the learning stations and the revised sets are being used in the schools this year. The stations are distributed through our county programs, with scheduling done on the local level.

The surveys and focus groups also produced another interesting piece of information. When asked whether they wanted a more elaborate curriculum on the issue, teachers, by a wide majority, said no. Those surveyed noted that they preferred shorter activities to more elaborate curriculum.

The Future

Public education will continue to be an important focus of Minnesota's household hazardous waste program. The MPCA hopes to develop additional tools for counties to use in providing education to their residents. As counties develop their own materials, we hope to see sharing of ideas across the state.

School activities, especially for the junior and senior high school level, are especially needed in Minnesota. We hope to work with educators in our state and elsewhere to develop activities, similar to the learning stations, that will serve the older age group.

We see education as the future. With the costs of waste disposal rising, waste reduction through education is critical to the success of household hazardous waste programs.

COMMUNITY EDUCATION AND ACTION

Sarah Dewey
Household Hazardous Waste Project

BACKGROUND

The Household Hazardous Waste Project provides information on the safe use, storage and disposal of household hazardous materials. In Missouri, the Department of Natural Resources is responsible for holding collections. Since 1989, five collection events have been held in Missouri. Unfortunately, as in many states, fiscal concerns will probably limit the number of future collections. These collections help to promote an awareness of household hazardous wastes in a climate of concern over solid waste issues in Missouri.

In order to assist individuals and communities to understand the issues of household hazardous waste, HHWP developed a course called *From Awareness to Action!* HHWP designed its educational program with the idea that the problems of household hazardous wastes are community-based, requiring long-term education and solutions derived from the community.

COURSE SYNOPSIS

The course is a 6-hour workshop. The workshop is divided into three sections: background information about household hazardous materials, personal actions to reduce exposure in homes, and actions to protect the community and its resources.

1. Background Information About Household Hazardous Materials

- People come to this course from a variety of backgrounds, interests, and expertise. Therefore, we begin by reviewing the basics of household hazardous materials, such as hazardous properties and household hazardous waste categories.
- We present information on the health concerns from using household hazardous products including types and routes of exposure, and physiological responses to hazardous materials exposure.
- Household hazardous products impact the environment by contaminating water, air, and the food chain. Examples are presented for environmental exposure from the use, storage, and disposal of these products.
- We discuss the federal and Missouri legislative framework concerning the protection of the environment and citizens from household hazardous materials. This includes information about CERCLA, RCRA, FIFRA, FHSA and the recently passed Missouri Senate Bill 530, which calls for the

elimination of small quantities of hazardous waste from landfills by January 1, 1994.

- We discuss the information that is required on pesticide and non-pesticide hazardous product labels.

2. Personal Actions

This section describes concrete ways to reduce the purchase and improper use, storage, and disposal of household hazardous products. Each participant receives a *Guide to Hazardous Products Around the Home* and a pair of nitrile gloves. These gloves protect against exposure from many common household products.

- The class uses their label reading skills in a hands-on activity using actual household hazardous products. Each participant receives a product, tightly closed and sealed in a plastic bag, and a worksheet with questions concerning the information on the product label. After filling out the worksheet, the class shares some of the information they found on the labels. This activity applies what they have learned to their homes. They are then assigned to explain hazardous product labels and signal words to someone within the next 24 hours.
- We discuss safety precautions for safe use and storage of household hazardous products. Types of safety equipment appropriate for specific household tasks are demonstrated.
- Emphasis is placed on avoiding the need for these precautions by selecting safer products or making safer products at home.

3. Community Actions

This section of the course provides interested citizens and citizen groups with a blueprint for educating others in their community. Each participant receives a workbook that is a draft version of HHWP's Community Organizing Packet. This workbook outlines HHWP's community education program and has additional background information and educational materials.

- "Getting Organized" suggests the types of people in the community who have an inherent interest in household hazardous waste issues, such as fire fighters, trash haulers, landfill owners and wastewater treatment officials, departments of health, organizations such as the American Lung Association, parent-teacher groups, League of Women Voters, teachers, University Extension, and retailers. A worksheet is provided for compiling their names and areas of expertise. These people can be the foundation of a committee or can provide community support for a household hazardous waste education program.

• This part also provides information on organizing a group, such as defining goals, objectives, action plans, and timelines. There is a worksheet for outlining a timeline for action.
• "Identifying Resources" helps to identify people and organizations in the community who can answer citizen's questions. We discuss potential community avenues for toxic waste reduction that do not involve collection events. A worksheet helps identify outlets that accept household hazardous wastes for recycling and reuse.
• "Educating the Public" suggests ways to address the issue to the public that were successfully used in other communities. Many of these ideas were found in HHWM News and past conference Proceedings. The workbook also contains activities developed by HHWP. Most of these educational activities can be used by school-aged children and adults. The Stored Waste Abatement Program (SWAP) is a waste exchange activity specifically for adults. SWAP connects people with unwanted, but usable, household hazardous products with people that will use them up. This activity is designed for small groups such as civic groups, clubs, church groups, and workplaces.
• The workbook also contains information on how to use the media for household hazardous waste education and how to organize a presentation on this issue. Line masters are included for participants to use in their own presentations.

4. Course Synthesis

The participants break into small groups and synthesize the day's information by developing an outline for a 30 minute presentation. The presentation outlines are for five different audiences: a civic group, local government officials, education group, health group, and an environmental group. The class is encouraged to focus their presentation outline to that specific audience.

COURSE FOLLOW-UP

• To develop a network of trained people, we mail participants a list of others from their area who have also taken the course. In addition, we compile a transcript of the presentation outlines developed during the course and send one to each participant. These outlines can provide them with a starting point for their own presentations.
• In the future, we intend to keep participants updated on future courses and course developments, such as HHWP's planned disposal guidance manual course.

OUTCOMES FROM TRAINING COURSE

1. Distribution

- We have trained 244 people from 5 states: Missouri, Kansas, Arkansas, Iowa and Michigan in 13 courses (Figure 1). This represents citizens from 73 municipalities.
- In Missouri, people from 26 counties have taken the course (Figure 2).

2. Participants Affiliations

- Participants record their affiliation when registering for the course. The most common groups that have taken this course are: City and County officials, citizen and civic groups, EPA-Region 7, Health officials and professionals, and interested citizens (Table 1). There is a wide range of affiliations represented at every course, which adds to its dynamics.

3. Activities by Participants

Participants use the information from this course in many ways to improve their communities (Table 2). Many of these activities reduce the amount of toxic wastes disposed of improperly, such as paint exchanges and recycling of motor oil, brake fluid, transmission fluid, button batteries and mercury.

- The paint exchange consisted of a one-day, city-wide swap in Shawnee Mission, KS. In other locations, businesses that accept usable paint were identified (such as theatre groups).
- In Howell County, the County Highway Department was persuaded to accept used motor oil from citizens and recycle it with their own used motor oil. Howell is the first rural county in Missouri to establish a county-wide system for recycling do-it-yourself, used motor oil.
- Many communities have located jewelers, hearing aid stores, and pharmacies that were already recycling button batteries from their customers and were willing to accept them from the public as well.
- Many communities have developed recycling lists which include outlets that accept household hazardous materials.
- We have trained city officials from communities with scheduled collection events in both Missouri and Kansas. Many of these participants used the information from the course to publicize the event and to further educate the community. Most of these participants organized a speakers bureau.

In two years this course has helped to bring the issue of household hazardous waste into focus in Missouri. It has helped to make the management of household hazardous wastes synonymous with recycling in Missouri.

Table 1. Organizations and affiliations represented by course participants.

36	City and county officials
31	Citizen and civic groups
28	EPA - Region 7
25	Health officials and professionals
21	Interested citizens
13	University Extension
11	Fire department
11	Public works
8	Businesses and consultants
8	County and regional solid waste committees
6	Community sanitarians
6	PTA and youth educators
6	University faculty
6	Waste disposal companies
5	Department of Natural Resources
5	Housing authority
4	Local Emergency Planning Committee
3	Chamber of Commerce
3	Soil conservation and water pollution control
3	Park and recreation department
2	Conservation Department
2	News media
1	Police department

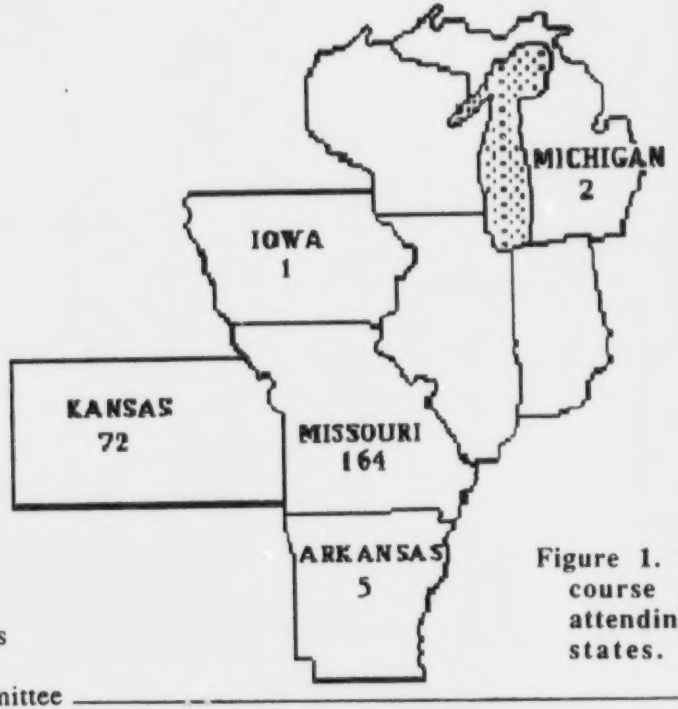

Figure 1. The number of course participants attending from area states.

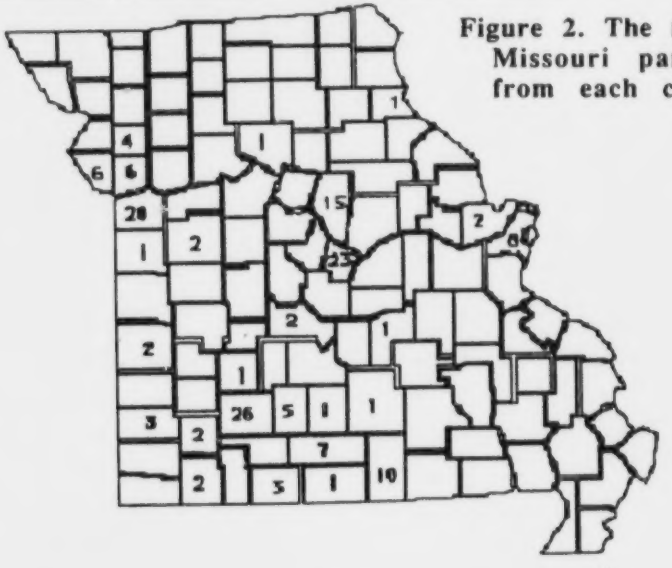

Figure 2. The number of Missouri participants from each county.

Table 2. HHW management activities developed by course participants.

PAINT EXCHANGE	Shawnee Mission, KS and Howell and Greene Counties, MO
MOTOR OIL, BRAKE FLUID AND TRANSMISSION FLUID RECYCLING	Howell , Greene, Douglas, Taney and Christian Counties, MO
BUTTON BATTERY RECYCLING	Greene, Taney, Howell, Douglas and Christian Counties, MO and Overland Park, KS
MERCURY RECYCLING	Howell County, MO
RECYCLING LISTS WHICH INCLUDE HHW	Greene, Howell, Douglas, Hickory and Christian Counties, MO and Columbia, MO
PRE-COLLECTION EDUCATION	Jefferson City, Columbia, and Liberty, MO, Howell County, MO and Kansas locations
PLANNING PERMANENT HHW COLLECTION SITE	Greene County, MO, Columbia and Kansas City, MO
SPEAKERS BUREAU	These have been developed by participants at every location where the course has been taught. Many individuals are presenting the issue on their own as well.

Cynthia Fridgen
CES Waste Management Specialist
Department of Resource Development
Michigan State University

ABSTRACT

This paper describes a comprehensive education and assistance program funded by the W.K. Kellogg Foundation through the GEM (Groundwater Education in Michigan) project. This program, implemented within the structure of the Michigan State University Cooperative Extension Service, exemplifies the outreach mission of the land grant system as it has existed in this country since 1865. The program consists of assistance provided by four full-time district agents. Each has a toll-free information line for Michigan citizens to call for information about the purchase, use, or disposal of common household products, as well as assistance on setting up a collection center. The agents are also conducting a series of day-long training seminars for Michigan citizens who wish to become volunteer leaders in this area. And they are available to speak to school children and local organizations. An expert team of environmental professionals provides backup to the agent team, and a substantial base of educational materials has been developed for dissemination throughout Michigan. This program is funded for three years.

A COMPREHENSIVE EDUCATION AND ASSISTANCE PROGRAM

INTRODUCTION

U.S. citizens generate a variety of potentially hazardous waste as a result of their lifestyles. Many of the products used to maintain home, yard, vehicle, and self are complex compounds that can harm the environment if misused or discarded irresponsibly. In many cases people are just not aware. Since these generators are not regulated at the point of purchase nor at the point of use or disposal, it falls to the educative process to instill a behavior of voluntary compliance with the best possible practices within the general population. Being aware of what is hazardous and what is not is essential if citizens are to make responsible decisions about purchase, use, and disposal. Having an opportunity to exhibit responsible behavior is critical if we are going to protect our sensitive environment. Based on the assumption that the Michigan State University Cooperative Extension Service could implement an education and assistance program that would be acceptable to the

citizens of Michigan and effective in protecting our natural resources from small quantities of hazardous materials generated by householders, farmers, and small businesses, a grant was written to the W. K. Kellogg Foundation.

The key objective of the grant was to provide a convenient, low-cost, nonthreatening contact for Michigan's citizens. This contact would be four full-time Hazardous Waste Management (HWM) District Agents located strategically around the state. These agents would:

- Provide consumer, management, and disposal information and assistance to small and very small quantity generators.
- Disseminate educational information to prevent the accumulation of hazardous waste materials.
- Work with local government units to institutionalize hazardous waste collection opportunities.
- Conduct workshops to educate local community leaders to extend the knowledge base more broadly.
- Help set up rural cooperatives for hazardous waste collection and disposal.
- Conduct research to better understand the user of the HWM information system.
- Record the ZIP code of each caller and expand the research base for further evaluation.

YEAR ONE

Year one of the grant project has focused on set-up and implementation of the HWM district network. A search process was put in place to identify qualified candidates for the HWM agent positions. Interviews were held and three persons were selected within the first three months. A suitable candidate was not identified for the Oakland County position and a second search process was implemented. In August 1989 a district agent was hired for the final position.
Let me introduce the District Hazardous Waste Management (HWM) Agents to you.

Ann Hiles
Location: Cheboygan County (CES office)
Hired: May 15, 1989
Address: County Building
870 South Main Street
Cheboygan, Michigan 49721
Phone: 1-800-468-8896 Local: (616) 627-8815

Monica Joseph
Location: Baraga County (CES office)
Hired: May 23, 1989
Address: Courthouse Annex
5 East Baraga Ave.
L'Anse, Michigan 49946
Phone: 1-800-624-4100 Local: (906) 524-7503

Mark Piavis
Location: Ingham County (Ingham County Health Department)
Hired: June 5, 1989
Address: 5303 S. Cedar Street
Lansing, Michigan 48909
Phone: 1-800-468-8879 Local: (517) 887-6988

David Schmidt
Location: Oakland County (CES office)
Hired: August 28, 1989
Address: 1200 N. Telegraph Road
Pontiac, Michigan 48053
Phone: 1-800-468-9612 Local: (313) 858-0880

The agents were hired under a vacancy announcement.

An intensive three-day technical training school was held for the agents. The Home Chemical Awareness Coalition (HCAC), a team of technical experts representing the relevant agencies and organizations in Michigan with responsibility for maintaining environmental quality, was responsible for the training. Agents were trained in the use of a Telephone Answering Guide, as well as the technical aspects of hazardous waste disposal. They also received training in the process aspects of the job, including but not limited to (1) teaching techniques, (2) writing press releases, (3) dealing with the media, and (4) computer capabilities.

Additional training opportunities were instituted as the year progressed. Agents are supported to attend one national conference per year and two instate training sessions in order to maintain a current knowledge base in this rapidly changing field.

COMPUTERIZED DATA BASE MANAGEMENT SYSTEM

The paper and pencil telephone answering guide was developed into a computerized response and data base management program by the Michigan State University Cooperative Extension Service Computer Support Services unit. Each HWM agent is currently using a Zenith 20Mb hard disk drive computer unit to respond to calls and manage incoming information. A document is generated that acts as a hard copy response to the call-in contact.

AGENT OBJECTIVES AND ACTIVITIES WITH RESPECT TO INITIAL GOALS AND STRATEGIES

Each of the four agents has participated in a variety of activities in an effort to achieve the initial goals and objectives of this program. The particular activities vary from agent to agent and county to county; however, all focus on implementing specific strategies aimed at protecting water quality through the control of unregulated hazardous materials. The vast majority of activities fall into one of the following six categories:

A. Agents enhance their personal knowledge of household hazardous wastes through conferences, seminars, meetings, tours, etc.
B. Agents increase the awareness and understanding of household hazardous waste programming within the Cooperative Extension Service by giving seminars for professional CES staff as inservice training.
C. Agents increase target audience awareness and understanding of hazardous wastes in each county in Michigan by generating newspaper columns and newsletters, and appearing on radio and television programs.
D. Agents establish and maintain a toll-free information line.
E. Agents begin efforts to establish Household Hazardous Waste Advisory Teams to lend support to programming efforts and expand their effectiveness in the communities.
F. Agents provide education and assistance to target audiences in each county in Michigan through group presentations, mass media, fairs, meetings, etc.

Each category is described in greater detail below, citing specific activities pursued by the agents.

A. Agents enhance their personal knowledge of household hazardous wastes through conferences, seminars, meetings, tours, etc.

While all four agents began the program with a good working knowledge of household hazardous waste, each has sought opportunities to ex[illegible] and his/her base. Through these efforts, agents have attained a greater knowledge of (1) current issues and laws surrounding household hazardous waste management and control and (2) composition and toxicity levels of various chemicals and hazardous wastes. By continually advancing their knowledge and perspective, the agents are better able to respond to and advise clientele with up-to-date, informative, and accurate information.

B. *Agents increase the awareness and understanding of household hazardous waste programming within the Cooperative Extension Service by giving seminars for professional CES staff as inservice training.*

Networking with other Cooperative Extension Service agents, as well as directors and staff, is an extremely effective method of disseminating project specifics. The agents have devoted quite a bit of time to this task, and have managed to meet with a majority of the counties' extension personnel and other community leaders. Through these efforts, the agents have provided critical information within the Cooperative Extension Service and, perhaps more importantly, ascertained names of individuals, farmers, businesses, and groups who may best be served by this program.

C. *Agents increase target audience awareness and understanding of hazardous wastes in each county in Michigan by generating newspaper columns and newsletters, and appearing on radio and television programs.*

As a major goal and essential function for the long-term success of this program, the agents have focused their attention on reaching a broad base of people concerned about household hazardous waste. This has been successfully achieved primarily through a variety of media sources as well as through other independent groups concerned with household hazardous wastes. Agents have disseminated HWM information through

1. Television
    a. Interviews
    b. Educational programs
2. Radio
    a. Interviews
    b. Talk shows
3. Newspaper articles
4. News releases
5. Questions and answers from information line published in county sources

6. Contacts with other agencies as a result of programming efforts
    a. American Chemical Society
    b. Health departments
    c. Department of Natural Resources
    d. Northeast Michigan Council of Governments
    e. Northwest Michigan Council of Governments
    f. Michigan Association of Counties
    g. Soil Conservation Service
7. Meetings of groups concerned with household hazardous waste
8. Home Chemical Awareness Coalition bulletin mailings

D. Agents establish and maintain a toll-free information line.

A focal point of this program is the establishment and maintenance of a convenient, free, non-threatening information line that farmers, small businesses, and individuals can use to ask questions related to the purchase, use, and disposal of household hazardous wastes. A toll-free information line was established in each of the four area codes in Michigan and has been in operation for the better part of 12 months. Agents typically spend nearly half of their working hours in the office answering and responding to inquiries. Agents respond to all inquiries either immediately or soon thereafter when research is required. The Home Chemical Awareness Coalition reference book for disposal of household hazardous wastes in Michigan is often used as an aid. Inquiries not specifically handled by the agents are directed to the proper authority/agency. Each call is assessed to determine (1) the profile of the caller, (2) the nature of the question, and (3) specific chemical(s) in question. The number of calls handled per month vary from approximately 50 in the 906 area code to 120 in the 517 area code. All the agents, however, have been responding to an increasing number of calls each month, a trend that will most assuredly continue as information regarding this program continues to spread. Listed below are some of the methods used to advertise the information line, as well as activities involved with its maintenance.

1. Establishment/advertising
    a. Announcements
    b. Brochures
    c. Interviews
        Radio
        Newspaper
        Television
    d. News releases
2 Process communications
    a. Answer and respond to calls
    b. Record information regarding caller, problem, and chemical

E. Agents begin efforts to establish Household Hazardous Waste Advisory Teams to lend support to programming efforts and to expand their effectiveness in the communities.

Toward this end, agents have begun to formally seek those individuals who possess suitable abilities and credentials. Guidelines have recently been distributed to facilitate the selection process and agents have begun identifying individuals through the following channels:

1. Meetings
2. Presentations
3. Office visits/tours
4. Recommendations from County CES Directors

F. Agents provide education and assistance to target audiences in each county in Michigan through group presentations, mass media, fairs, meetings, etc.

Also as focal point in this program, the agents have directed their energy and creativity toward a diverse set of activities that are aimed at both the general public (media, fairs) and specific individuals and groups (presentations, meetings). The majority of these activities take the agents out of the office, giving them a first-hand view of the problems and concerns in the counties. Through their efforts agents not only educate and assist "today," but also familiarize themselves with other issues of concern so they can better serve in the future. A review of the agents' efforts to educate and assist is listed below.

1. Group presentations
    a. County workshops
    b. Eastern Michigan Environmental Action Council
    c. Waterford Chapter of Civitan
    d. AARP
    e. U.P. Environmental Coalition
    f. Kalkaska High School
    g. Montcalm Tomorrow
    h. Homemaker lesson day
2. Fairs
    a. U.P. State Fair
    b. Baraga County Fair
    c. Iron County Fair
    d. Houghton County Fair
3. Media
    a. Television
        Interviews
        Public service announcements
        Educational programs
    b. Radio
        Interviews

Talk shows
c. News releases

4. Area programs
   a. Assist with hazardous waste collection day
      Answer questions
      Distribute information
      Distribute informative questionnaires
   b. Develop programs for permanent drop-off sites
   c. Review existing collection programs
5. Group meetings
   a. SAVE IT
   b. Home Chemical Awareness Coalition
   c. Power Plant Engineers
   d. Michigan Association of Environmental Professionals
   e. Oakland County Public Service Committee
   f. Gaylord
   g. Scottville
   h. Birmingham Community House
6. Grant application; aided counties in developing a grant to Department of Natural Resources to set up a household hazardous waste disposal program
7. Distribution of educational literature to:
   a. Educators
   b. Environmental groups
   c. Information line inquires
   d. Participants at fairs, group meetings, presentations

CLIENT RESPONSE/ATTITUDE TOWARD AGENT ACTIVITIES

The aforementioned activities have been well received by individuals and/or groups utilizing the available resources. This is evidenced first of all by the extensive use of the toll-free information line. Each caller, not surprisingly, has unique questions and concerns with respect to one of the areas within household hazardous waste management. The majority of calls, however, can be grouped into four main categories. They include

1) Paint and related products
   Old paints
   Paint thinners
   Solvents
2) Automotive and related products
   Used motor oil
   Antifreeze
   Car batteries
   Old gas/oil mixture from lawn mower and/or snow blower
3) Educational information
   Brochures
   Displays
   Interviews
   Out-of-state inquiries about Michigan's program

Speeches
Meetings
4) Pesticides

Other areas receiving numerous calls, but not included in the above four categories, include recycling, household cleaners, batteries, and mercury.

Several examples of actual calls and requests will help illustrate the diversity and relevance of calls handled on a daily basis.

A dental hygienist called asking about recovery of silver from the dental x-ray developing solution. The agent phoned the Eastman Kodak environmental technical service information line and later received information on a Kodak chemical recovery cartridge. This device collects silver before the photo processing effluent is discharged to the sewer. The agent passed all of the information on to the hygienist.

In researching the used antifreeze problem, an agent discovered a system that recycles used antifreeze and turns out a reusable product as good as the original. This information was passed on to the other agents, as well as numerous callers wondering how to dispose of used antifreeze.

A caller indicated that several ounces of quicksilver (mercury) was left in her father's home when he passed away and wondered how to dispose of it. The caller's father had been an instrument repairman and had salvaged mercury from mercury switches and test equipment. After several calls the agent located a company that would accept mercury at a scrap price of $1.00 per pound; while this won't make the caller rich, the disposal option is a lot better than some alternative that may lead to contamination of our lakes and streams.

During a visit to a school, an agent was surprised to find out how aware the children were of common household hazardous waste items. The kids demonstrated a genuine interest in learning more about it and were thrilled at the prospect of making a difference on an individual basis by reusing, recycling, or finding alternatives.

One man was so overly concerned about the consequences not only of his actions

but the cumulative action of others that he would not dispose of his used antifreeze into the sanitary sewer even with assurances from his local sanitarian. He decided that he would keep his antifreeze stored until a household hazardous waste collection program came on line in his county. The agent is now working at setting up such a program to meet his needs as well as the needs of others in the community.

A solid waste coordinator from a mid-Michigan county called indicating that he was planning a household hazardous waste collection day. The agent related specific strategies that would help the efficiency of the program and followed up by sending out a variety of literature. After the program, the coordinator phoned again thanking the agent and explained that the collection went exceptionally well, mainly as a result of the appointment system discussed previously.

A salesperson from a large pesticide company called and indicated he was very interested in the services provided by the agent. He was looking for a source of information he could pass on to some of his customers concerned with pesticide disposal. He not only took all of the local agent's information for his own use, but promised to circulate the other agents' numbers to other pesticide salespeople throughout Michigan.

The initial success of agents' efforts is further evidenced by the enthusiastic response to their programs and presentations. The agents have made a conscientious attempt to reach all age groups and socioeconomic backgrounds. Participation at group presentations is often up around 100. Interest at county fairs has also been exceptional. Displays are designed by the agents help draw fair attendants to the booth where an agent stands ready to provide helpful information to inquiring citizens, as well as indepth brochures on a variety of topics. Events like these are superb for disseminating a great deal of information to a large number of people in a short span of time.

In addition to addressing groups on their own, agents have coordinated their efforts with representatives from related fields (e.g., recycling). In doing so, agents reach a larger number of people, and citizens obtain much more information than they otherwise would have without both present. It is our hope that as word spreads, more and more individuals will participate in programs and an increasing number of groups will request agents to speak at group meetings.

STATEWIDE EFFORTS

The state program leader for Solid and Hazardous Waste Management along with the Home Chemical Awareness Coalition (HCAC) and the coalition coordinator are responsible for management and support for the GEM project.

The HCAC provides expert backup as well as statewide recognition for the project. Materials developed by HCAC are used extensively by the agents in working with the citizens of Michigan.

Recently a series of brochures developed by HCAC and used by the HWM agents were picked up by the Meijers Corporation and reprinted for distribution in 50 stores throughout Michigan and Ohio. The agents are beginning to receive calls as a result of this expanded distribution of materials.

Initially two portable displays were developed by the HWM agent in the Upper Peninsula. These became the models for four commercial displays to be used statewide. Each agent now has a professional display that can be used at fairs and malls as well as college and family days. These displays measure 4' X 7' and have a lighted header that reads **HAZARDOUS MATERIALS INFORMATION**.

QUALITATIVE ASSESSMENT

The integration and understanding of the Michigan State University Cooperative Extension Service by four professionals has been a successful effort in growth and capacity building. An expectation has been put in place that the GEM Program will address water quality issues in concert with other relevant agencies. Those agencies will see and understand the value of education in protecting Michigan's water resources through the control of hazardous materials.

Year one of the program went very well. The agents were hired as expeditiously as possible; however, extreme care was taken to select individuals who exemplified the qualifications necessary to achieve success in this program, which is why one agent was selected approximately three months after the original three. While all individuals came in with excellent qualifications, the training provided, both within and outside the Cooperative Extension Service, prepared the agents to attain the program goals in years two and three. At this time, all computer equipment is on-line, and agents are well versed in the various software programs available to aid them in their efforts to serve Michigan citizens. The agents have met with a majority of Michigan State University Cooperative Exten-

sion Service personnel throughout their respective districts, and have developed a CES support system that stands ready and willing to assist in their efforts. Workshops, presentations, and poster sessions have been held as a result of CES contacts. Finally, the agents have developed an extensive library to help serve their clientele. In sum, we now have four highly qualified individuals positioned to serve the entire state of Michigan and meet the challenges and goals outlined in the grant proposal.

During year one, the agents have responded to numerous inquires, primarily from the toll-free information line. No attempt has been made, however, to ascertain the change in attitudes and beliefs as a result of agent efforts. We feel that in order to judge the relative success of this program, it is crucial to test consumer attitudes and beliefs. Toward this end, a preliminary questionnaire has recently been introduced, and is currently being used. Because this is such an important aspect of the long-term evaluation of this project, a more extensive questionnaire has been developed and will be utilized to measure attitudes and beliefs in relationship to action.

Although a primary goal of the GEM program is assistance to Michigan residents as they make day-to-day decisions about the purchase, use, and disposal of hazardous materials, the long-term goal of the program is to have a more aware and knowledgeable public. In this way the public will want to exhibit, and even insist on, positive environmental behavior for themselves and their neighbors. This goal is most appropriately accomplished through **Indepth** educational programs that enable and empower the citizenry to take **leadership** for a clean, environmentally sound future. This type of educational experience and reenforcement through a reteaching obligation can affect the beliefs and attitudes of the volunteer leaders developed.

In many cases the attitudes, beliefs, and perceptions of the citizen leaders can be divergent from the attitudes, beliefs, and perceptions of the environmental agency professionals who work in this field every day. In addition, the impact of the education programs should create a very different and more pro-environment set of beliefs than general citizens who have a need for the service but don't participate in the **Indepth** education experience. Taking leadership is akin to taking ownership. The citizen leaders will be recognized in the communities as owners of knowledge and will play the role of lay teachers. Their charge will be to increase awareness, organize opportunities, seek support (both financial and political), and to provide a linkage to the HWM agents in order to facilitate assistance for Michigan's citizens.

Another source of assistance for Michigan citizens is the cadre of environmental professionals who have technical expertise and are charged to provide information to, and regulate the behavior of Michigan's citizens. Unfortunately, this group of professionals are often perceived primarily as regulators in a negative sense and are, therefore, unable to perform this type of educative role.

The HWM agents provide a convenient (telephone) low-cost (free call) nonthreatening (nonregulatory) contact for Michigan citizens to gain information about environmentally sound decisions and behavior. In addition, the HWM district agents are trained educators with an "assistance first" commitment to Michigan's citizens. They enjoy a level of credibility that is difficult to duplicate in another context.

Summative evaluation of the GEM project will result in descriptive data on numbers of calls, types of waste materials, locations of stored materials, satisfaction of workshop participants, impact of reteaching activities, and numbers of local programs initiated as a result of substantial support from the team of Hazardous Waste Management District Agents.

Additional research will be conducted on user perception of the program as well as follow-up on user action taken.

An extension of the research work will be concerned with the long-term understanding of the role that this type of program plays in the total information network system as it exists in Michigan.

HOW TO Waste Types and Management

Judy Orttung

My comments on waste types and management will be taken from the perspective of advance planning for either a one day collection event or a permanent collection center. For those interested in a "hands on" perspective on this issue I refer you to the session on permanent collection centers and to the sessions on specific waste types.

In attempting to address this issue for a national audience I am particularly sensitive to the need to recognize significant regional differences in availability of commercial hazardous waste services, the different regulatory requirements imposed by the states and the diverse ways in which these programs have evolved in various parts of the country. Each of these factors may be significant for your program planning. If, for example, the nearest commercial hazardous waste incinerator is more than 1,000 miles away, you will need to consider the additional expense of transportation and/or look at other waste management options. Similarly you need to be familiar with your own state hazardous waste requirements when considering various management options. For example if a particular waste is not considered hazardous in your state, you may have more management options available to you than a program located in a state which considers that particular waste hazardous. Finally, as I mentioned earlier, household hazardous waste programs have evolved differently in various parts of the country. On the east coast it is not unusual for a hazardous waste hauler to assume generator status for the waste collected. That is not a common practice on

the west coast and thus may increase your expenses if such a requirement is included in your request for bid.

Despite these few regional differences, the types of waste coming in to collection programs are remarkably similar across the country, although relative amounts vary by community. Typical wastes which are routinely brought to collection centers include paints and paint related products, waste oil, household and car batteries, pesticides and other garden products, various adhesives, coatings and caulking materials, corrosives and hobby materials, In addition to these routine types of waste, a small percentage of wastes come in which require special handling. How you plan for and manage these wastes can significantly affect program costs.

In planning your program, keep in mind that the type of wastes accepted will determine the services required and the costs incurred. If your funding is limited, you may want to consider separate collection days for recyclable materials such as waste oil, paint and lead acid batteries. These wastes do not require management by highly trained technicians and are not as expensive to manage, yet generally make up anywhere from 50 - 80% of the wastes collected. Such a collection could take advantage of volunteer assistance as well as in-house staff to reduce labor expenses. If you do choose this option however, it is essential both to have an alternative collection planned for other types of household hazardous waste and a contingency plan for managing other wastes if they are brought in (or how you will reject these

wastes if that is your choice). It is easier to reject wastes if you can offer available alternative.

When setting up a one-day collection event which accepts all types of household hazardous waste you need to think about the range of wastes which may be brought in and determine how you will handle them. For example, if you were to receive roadside flares, organic peroxides, or water-reactive materials, do you expect the contractor to manage these wastes or are there other alternatives available to you? Roadside flares and organic peroxides which come in to our collection centers are given to the county bomb squad for detonation. Another example of a "hard to handle" waste is Calcium Carbide which is a water reactive material sometimes used to generate acetylene for welding. We have a local company which manufactures acetylene who has agreed to take the small amounts of calcium carbide which come into our collection program. The material is then used in generating acetylene and provides an outlet for what would otherwise be an expensive and hard to handle waste. For permanent collection centers with storage capacity, solutions to these waste management needs can be found on an as needed basis. However, for one day collection events some contingency planning is needed if the sponsoring agency wants to minimize costs. Alternatively, details for waste management of hard to handle wastes may be included in the contract.

How you ultimately manage each type of waste will also impact

program costs significantly. For example, there are several waste management options for managing paints, thinners and related products. These options include direct waste exchange, reconditioning for recycling, use as a supplemental fuel, and incineration. A direct waste exchange is the least costly if there is demand for the paint since there are no handling or disposal requirements. However only a small percentage of the paint which comes in is suitable for direct re-use. (Certainly, having a waste exchange table available at the event is one way to reduce waste management costs not only for paint, but other products as well.) Each of the other options have trade-offs between initial handling and waste management costs. For example, reconditioning latex paint is the cheapest waste management option available to us however, it requires labor intensive preparation to sort and screen the paint and consolidate it into 55 gallon drums. In our program we do this manually with the assistance of work-release personnel. Other programs have experimented with various mechanical devices to consolidate paint. Others rely on contractor services. If the paint is destined for incineration, the preparation of the paint will depend on the handling capabilities of the facility. Some will accept drum lots only, others may accept the paint stacked on a pallet and shrink-wrapped. Obviously the advance preparation required will vary by facility. When developing your plans, you need to know the various options available in your area.

In closing I want to again urge you to develop contingency plans

for the possibility that explosives or unstable chemicals are brought in. In the past I felt no one would knowingly bring in unstable materials because they would be wary of transporting it. I now realize that there are instances when people are faced with disposing of wastes with which they are unfamiliar. Frequently we have people bringing in waste for an aged or deceased spouse or parent. We also see a lot of waste left behind when people move. Unfortunately the people dealing with the waste do not know anything about it and are unaware of the danger to themselves or others. We have developed a close working relationship with the county bomb squad. It helps when managing such emergencies if the available resources are known in advance and some plan is in place.

WASTE MANAGEMENT OPTIONS - IMPACT ON COSTS OF WASTE DISPOSAL

LEEANN MERASHOFF, FIELD SERVICE MANAGER

Several years ago there were a lot less choices to make with regard to hazardous waste disposal and with waste management options - waste was either landfilled or incinerated.

Today we have a lot more choices and lot more difficulty and complexity in choosing waste management options. For all of us cost is a major factor in managing HHW. Today we need to be as saavy in choosing waste management options as we are in choosing "green" products from the store shelves. We have to do some investigation and be a little crafty in determining what management options will be most cost effective for our programs.

The ultimate cost of waste disposal from HHW programs is the result of a network of factors and variables that affect the waste management options we use. Let's look at these factors and how they affect costs.

Without doing any analysis we can generally assume that we will maximize cost savings by waste consolidation, and by recycling and using reclamation practices whenever possible. However, to fine tune our programs and maximize cost savings we need to look at all the factors. Some of the variables involved can have a tremendous impact on costs:

Factors affecting waste disposal costs:

1. Manner in which consolidation is done.
   Examples: Sludges vs liquids will increase costs 3-fold.
   Contamination of fuels blending materials with water or low BTU solvents will increase costs.

2. Labor costs for consolidation.
   Is the labor skilled or trained sufficiently to make consolidation worthwhile?

3. Land ban regulations.
   These affect waste disposal options significantly because many end disposal facilities have to restrict the wastes that they can accept or the manner in which they can be accepted. In general, land ban regulations have increased the cost of waste disposal.

4. Proper packaging for the intended disposal facility. By learning and following the packaging guidelines for facilities you can avoid surcharges and repack charges that may be applied if the drums are packed incorrectly. Investigative several packaging methods for each waste stream and determine the most cost effective method.

5. RCRA vs solid waste management. Some waste streams may have acceptable waste disposal options as either hazardous waste or as solid waste. Investigate which is more cost effective.

6. Availability of ultimate disposal sites and methods in your geographic region. Transportation can be significant variables. Find out how transportation of wastes will be charged.

Waste Management Plan:

The following ideas can be used as steps in developing a waste management plan that will minimize waste disposal costs:

1. Analyze the waste streams you are generating and how they are currently disposed of and for what costs.

2. Look at each of these waste streams in terms of waste stream segregation. In waste disposal, the more "pure" or separate a waste stream, the less the cost for disposal is likely to be. In particular, keep waste physical states separate.
In particular, look at labpack waste streams and pull out any organic liquids that can be consolidated as a bulk waste stream. In particular look at waxes, polishes, cleaners, and automotive products.

3. Work with your disposal company to make sure you are creating each waste stream as cost-effectively as possible. Make sure you have the proper quidelines and that your wastes are not consistently off-spec.

4. Train employees in packaging and waste consolidation techniques. Provide for update training.

5. Set up a quality control program to make sure wastes are packaged or consolidated properly, as well as properly labeled. Review waste streams regularly with the waste disposal company to become aware of any changes that may be affecting costs of waste disposal.

6. Review waste disposal costs per waste stream on a regular basis and make changes in packaging or disposal method when necessary and feasible.

RFP's AND CONTRACTS

Elizabeth M. McCormick[1]

Virtually every type of household hazardous waste collection program requires the use of a contractor to perform some service. Typically, a one day program asks a contractor to unload cars, segregate and package waste, transport and dispose of collected wastes, and provide supplies and services such as protective clothing, spill control equipment, and contingency planning. A permanent program may only have the contractor transport and dispose of collected wastes, or may ask for training and supplies as well. Regardless of the type of program and extent of contractor participation, a program sponsor wants to obtain the best available services at the most reasonable price. This generally means using the competitive bidding process to evaluate possible contractors. The competitive bidding process includes three main elements: a Request for Proposal (RFP) prepared by the program sponsor, Proposals submitted by potential contractors, and the Contract negotiated between the program sponsor and successful bidder.

Each of these elements could be the subject of an entire presentation. Due to our limited available time, I will concentrate on the Request for Proposal. The RFP lays the groundwork for the other elements.

Program sponsors are often told to begin planning at least 6-9 months before their collection program. This is also the time to begin working on the RFP and contractor selection process. It may take a month or more to prepare the RFP, then allow contractors at least two weeks (preferably more) to review the RFP and prepare proposals, two weeks or more for sponsors to review proposals, and another two weeks to finalize the contract negotiations. Pre-bid conferences and RFP addenda may extend these times. Some states such as California, Pennsylvania, and New York then review plans for the program, including the contractor. Allow time for revisions at each step of the process. Ideally the contractor selection should be complete and the contract signed several weeks before the collection program. This allows the sponsor to work closely with the contractor during the final, often hectic, days leading up to the collection.

Another reason to begin early is that preparing the RFP can help the program sponsor plan the program. Being forced to write something means that you have to think it through and helps to clarify issues. Begin with the basics - who, what, when, where, and why. There are two additional basics to include - how much will it cost and how well will it be done. Once the sponsor has an outline of their technical requirements, the local legal and purchasing

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departments must be contacted. Many local governments have specific requirements which must be included with all purchases. This may include equal employment opportunity programs, bid and performance bonds, anti-apartheid policies, insurance, public right-to-know, minority subcontracting, or other requirements. Legal and purchasing departments may also be willing to perform some of the work associated with the competitive bidding process, such as arranging pre-bid conferences or handling financial arrangements.

Be as specific as possible in the RFP. The more information potential contractors have, the better their proposals are likely to be. The sponsor should also attempt to make life easier for those evaluating proposals. Include in the RFP a description of the preferred format for proposals. This allows reviewers to compare proposals from different contractors directly, item by item. It is also a sort of evaluation in itself - if a potential contractor does not follow directions in preparing their proposal, will they follow directions for the collection program?

Having suggested that sponsors make detailed and specific plans, I also suggest that sponsors remain flexible. Remember that the goal of this process is to have the best possible program. Experienced contractors have participated in many HHW programs and may offer alternatives which will make the collection program operate more smoothly.

Outlined below are typical elements of a Request for Proposal for a HHW collection.

A. INTRODUCTION

This section should:

1. Name the program sponsor.
2. Provide information on the community including approximate population and demographics (urban, suburban, or rural).
3. Mention whether this is the first collection or whether prior collections have been held, and if so, when and how much was collected.
4. Briefly describe the scope of work - i.e. - "The County is seeking proposals from qualified contractors to provide for the proper handling, transportation, and disposal of hazardous wastes collected from County residents."

B. DESCRIPTION OF COLLECTION PROGRAM

This section should include:

1. Proposed location, including a map and site diagram if possible.
2. Proposed date.

3. Hours of collection.
4. Wastes to be collected - such as pesticides, paints, auto products, cleaners, yard care products, etc..
5. Wastes to be rejected - such as compressed gases, explosives, unknowns, etc..
6. Limitations - such as residents only, no businesses, or quantity per participant.
7. Waste diversion plans - for recycling or reuse of auto batteries, motor oil, paints, or other materials which will not be handled by the contractor.
8. Participation by local emergency response authorities, including police, fire, EMS, bomb squad, etc.
9. Description of functions to be performed by sponsor personnel and community volunteers, such as on-site project manager, traffic direction, survey taking, site set up and clean-up, meals, etc.
10. Support functions - solid (non-hazardous) waste management, availability of water, electricity, restrooms, etc.

C. CONTRACTOR RESPONSIBILITIES

This section should specifically describe the functions of the contractor. For example:

1. Assist the Sponsor in planning and organizing the collection program, including answering questions, being available for site visit before the program, and responding to media questions.

2. Provide all equipment and supplies necessary for those portions of the collection site used for collection, handling, packaging, and transportation of household hazardous waste, including safety equipment.

3. Be responsible for the set up and take down of those portions of the collection site devoted to collection, handling, and transportation of household hazardous waste.

4. Be directly responsible for unloading participants' cars; segregating hazardous, non-hazardous, and recyclable materials; packaging all hazardous wastes in accordance with Department of Transportation requirements; preparing container content sheets, manifests, notifications, certifications, and other shipping documents; transportation; and disposal of collected hazardous wastes.

5. Provide properly trained and qualified staff necessary to review, segregate, package, manifest, and transport incoming wastes.

6. Coordinate with sponsor and local emergency response personnel to develop a site contingency plan, and train all site personnel, including volunteers, in site safety procedures such as evacuation signals and routes.

7. Assist members of the public with information on their wastes, including the reasons for any waste rejection.

8. Provide for the safe treatment and disposal of collected household hazardous waste in compliance with all applicable state and Federal regulations.

D. BID CONDITIONS

This section should include:

1. Any specific local purchasing requirements, such as equal employment opportunity language, non-collusion statements, etc.

2. Preferred waste management methods - for example, "The preferred method of waste management is recycling or reuse, followed by RCRA incineration or chemical treatment. Land disposal is to be minimized to the extent possible."

3. Bid bond or performance bond requirements. For example, "Bidders are required to provide a $1,000 bid bond with their proposal. The successful bidder will be required to provide a $50,000 performance bond not later than 10 days before the collection program." The bid bond guarantees that if the bidder wins the award, the bidder will enter into a contract with the sponsor. The bid bond expires when a contract is signed. A performance bond guarantees the performance of the project in accordance with the contract, and provides a mechanism for the sponsor to recover funds if the contractor fails to perform.

4. Insurance requirements - including workers' compensation, general and automobile liability, and perhaps environmental impairment liability. Be realistic in this section - asking for unusual insurance coverages may limit the number of possible contractors.

E. SCHEDULE AND DIRECTIONS FOR PROPOSAL SUBMISSION

This section should include:

1. The date of the pre-bid conference, if any. Many collection programs do not have pre-bid conferences.

2. Name and telephone number of a sponsor contact if potential bidders have any questions concerning the RFP. For consistency and fairness, if information is provided to one bidder, it should also be sent to other potential bidders in the form of an addendum.

3. Number of copies of proposal requested - typically from one to three, occasionally more.

4. Location for submission, including contact name, street address rather than P.O. Box, and telephone number (necessary for overnight delivery services).

5. Deadline for submission - both date and time. For example, "Proposals may be mailed or delivered to the office, but must be received in the office no later than 3:00 p.m. on Friday, February 16, 1990."

F. PROPOSAL EVALUATION CRITERIA

Few proposals are evaluated strictly on cost factors. For the sponsor's protection, the proposal evaluation should also include the background, experience, and technical criteria provided by bidders. Typically, evaluation is weighted among these factors, for example:

Background and Experience	30%
Technical Proposal	40%
Cost Proposal	30%

This section should also include an "escape" clause such as "the sponsor reserves the right to waive minor informalities in proposals, to reject any and all bids, to evaluate alternative methods or proposals, and to award this contract to the bidder believed most advantageous to the sponsor." This allows the sponsor to take advantage of alternatives or innovations offered by potential contractors, without being strictly bound by the terms and conditions of the RFP. Without this type of clause, an unsuccessful bidder might have grounds to legally challenge the contract award.

G. PROPOSAL FORMAT

This section should include the format and contents of the bidder's proposal, for example:

All proposals must contain the following information:

1. COVER LETTER OR TITLE PAGE: Name, address, and telephone number of bidder, date of proposal, and name of contact.

2. BACKGROUND AND EXPERIENCE:

   a. Company background - provide a description of bidding company, including primary business and experience in hazardous waste management.

   b. Related project experience - all bidders are required to provide at least five (5) household hazardous waste projects that were performed by your company in the past year. This list should include the name, telephone number, and a contact for each project, and a brief description of the project.

   c. Employee experience - bidders are required to provide a list of the personnel who will be involved in this collection program, including their degree, training, experience, and a description of their involvement with this program.

   d. Licenses and Permits - bidders are required to possess all necessary State and Federal licenses or permits required for the transportation and disposal of hazardous wastes. Provide evidence of such permits.

3. TECHNICAL PROPOSAL:

   a. Staffing - provide a description of the bidder's proposed staff and management for this project, including name of bidder's Project Manager. List the number of personnel by job type, such as chemist, technician, driver, etc. with a summary of their duties at this program.

   b. Site setup - submit a diagram of the proposed HHW site detailing how the collection activities will be organized. A detailed description of

site activities including waste receipt, segregation, packaging, testing, loading etc. should be attached to the diagram.

c. Equipment list - provide a list of equipment which will be provided at the collection site, including all fire prevention, safety, personal protective equipment, and other supplies or equipment the bidder deems suitable or necessary for this project.

d. Site safety plan - describe procedures to minimize the risk of spill or fire, and to protect site workers and participants.

e. Contingency plan - provide a format for a contingency plan, including description of notification procedures for on-site emergencies and evacuation of participants and site workers if necessary.

f. Packaging - provide a description of packaging methods used for collected wastes, including safety procedures if any materials are consolidated or bulked on site.

g. Unacceptable wastes - list any wastes which the bidder cannot accept, and if possible, provide alternatives for managing these wastes.

h. Training of sponsor personnel and volunteers - provide a description of training to be provided to sponsor personnel and to volunteers, and how such personnel or volunteers are to be incorporated into the collection activities.

i. Transportation and disposal facilities - provide a list of all transporters and treatment/storage/recycling/disposal facilities which may be utilized in performance of this program. The list should include the name, address, and I.D or permit number for each transporter or facility.

j. Insurance - provide documentation of required insurance coverage.

4. COST PROPOSAL

a. Mobilization - provide the cost for site set up, including personnel. Give costs if overtime, additional personnel, or additional equipment is requested.

b. Supplies - list supplies to be used and their unit costs.

c. Transportation and disposal - list per unit costs for transportation and disposal of collected wastes.

d. Miscellaneous - include line item costs for bonds (if applicable), laboratory analysis, waste approval fees, planning assistance, training, or other charges not included above.

BUDGETS FOR HOUSEHOLD
HAZARDOUS WASTE PROGRAMS

Emy Chan Meiorin
Association of Bay Area Governments
415/464-7900

BUDGETS FOR ONE-DAY HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS

FACTORS AFFECTING COLLECTION PROGRAMS

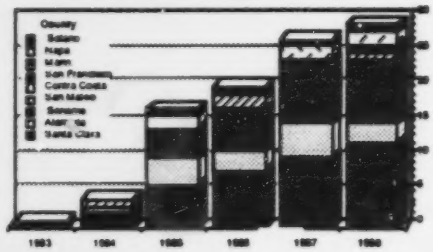
① Community Awareness
② Participation Rate
③ Waste Generation Rate
④ Ongoing Program
⑤ Latex Paint Handling
⑥ Notification/publicity Costs

FACTORS AFFECTING COLLECTION PROGRAMS

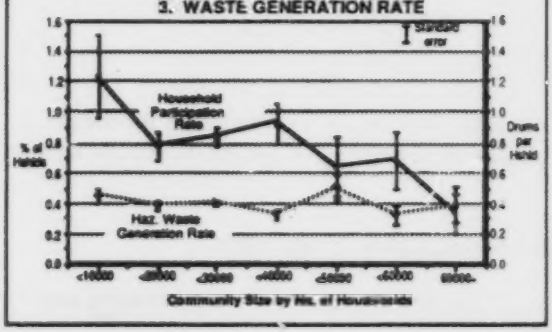
1. COMMUNITY AWARENESS

- Increase in Collection Programs
- Environmental Activism (e.g. Community Recycling Program)
- Local Hazardous Waste Problem(s) Incident(s)

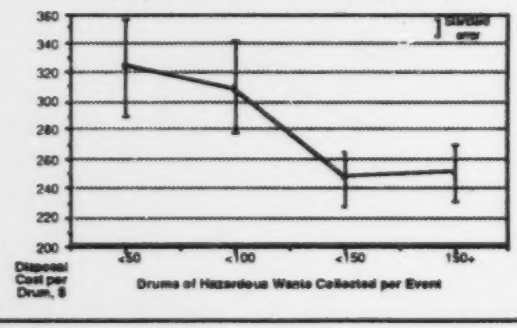
Increase in Collection Events in the San Francisco Area 1983-88



2. PARTICIPATION RATE
3. WASTE GENERATION RATE



Disposal Costs vs No. of Drums Collected



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BUDGETS FOR HOUSEHOLD
HAZARDOUS WASTE PROGRAMS

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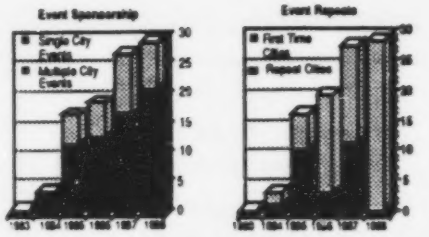
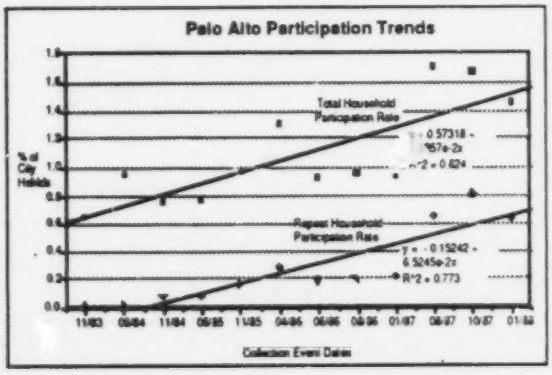
FACTORS AFFECTING COLLECTION PROGRAMS

4. ONGOING PROGRAM

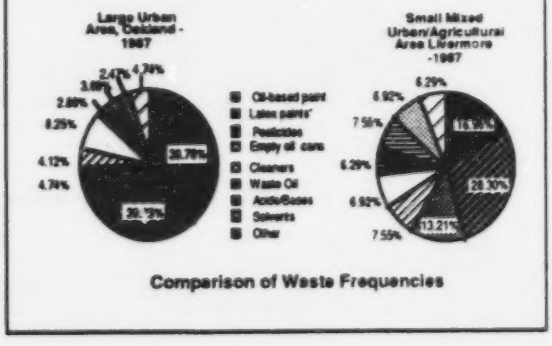
- First-time vs Repeat Events
- Multiple-City Sponsorship
- Participation Trends





5. LATEX PAINT HANDLING
Alternative Handling Methods

1. Refuse to Accept
2. Landfill Disposal, Crush cans, dry and landfill
3. Landfill Disposal, Pour out on sheets, dry and landfill
4. Independant Recycling (HW Contractor)
5. Bulk, Solidify and HW Landfill
6. Paint Consolidation by Householders before Program
7. Independant Recycling (Community Groups)
8. Lab-Pack Paint Cans HW Landfill



6. SAMPLE NOTIFICATION COSTS

NOTIFICATION METHOD	Cost per 1000 units
Utility bill inserts	$10–15
Flyers / handouts	$30–60
Indirect mail (Advertising Mailer)	$130–200
Direct Mail	$120–450
Door-to-door Distribution	$30–550

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BUDGETS FOR HOUSEHOLD
HAZARDOUS WASTE PROGRAMS

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DEVELOPING COST ESTIMATES

- Cost Estimation Formula
- Sample Projections - Alameda County
- Optional Factors Afftecting Participation Rate

DEVELOPING COST ESTIMATES

OPTIONAL FACTORS

- Community Size
- Environmental Awareness
- Effectiveness of Publicity
- Site Location
- Predominant Residence Type

OPTIONAL FACTORS

–0.5 %	+0 %	+0.5 %
COMMUNITY SIZE		
>40,000 hshlds	10,000-40,000 households	<10,000 hshlds
ENVIRONMENTAL AWARENESS		
Low income/ education areas	Avg Environ. awareness	Recycling program haz waste problems
PUBLICITY		
<40% hshlds media only	40-60% hshlds mailers, etc.	>60% hshlds door-to-door

OPTIONAL FACTORS

–0.2 %	+0 %	+0.2 %
SITE LOCATION (multiple-city programs)		
Distant site	Adjacent City	Host city or most populous city
RESIDENCE TYPE		
≥50 % Multiple units	<50 % Multiple units	

DEVELOPING COST ESTIMATES

Number of Households in Target Service Area X Household Participation Rate (%) X HHW Generation Rate (drums, gallons or lbs) X HHW Disposal Costs ($/drum, gallons or lbs)

SAMPLE PROJECTION

Alameda County Pilot Household Hazardous Waste Collection Program
Projected Waste Generation and Project Costs, April 1987

SubArea and City	Number of Households in 1980	Projected Participation Rate, %	Projected Number of Participants (rate x hshlds)	Projected Waste Drums @0.3-0.4 drums/hshld	Projected Disposal Cost, $ @$250/drum
Area 1					
Oakland	141,857	0.4	567	170-227	
Alameda	26,517	1	265	80-106	
Piedmont	3,763	1	39	11-16	
Subtotal	171,937		880	261-349	$65,000-87,000
Area 2					
Berkeley	44,704	1.2	536	161-215	
Albany	6,868	1.3	82	25-33	
Emeryville	2,132	1	21	6-8	
Subtotal	53,691		640	192-256	$48,000-64,000

Does not include publicity costs or ABAG/City staff labor costs

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BUDGETS FOR HOUSEHOLD
HAZARDOUS WASTE PROGRAMS

Emy Chan Meiorin
Association of Bay Area Governments
415/464-7900

BUDGETS FOR PERMANENT HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS

BUDGETS FOR PERMANENT PROGRAMS

ONE-TIME COSTS
- Planning
- Staff Training
- Equipment
- Site Prep./Construction

ON-GOING (ANNUAL) COSTS
- Staffing
- Advertising
- Hauling/Disposal
- Insurance
- Supplies
- Depreciation/amortization

ONE-TIME COSTS (Santa Clara Co. CA)

1. PLANNING COSTS	
• Staff time: 12—24 months	Contributed
2. EQUIPMENT	
• Storage facilities (hazbins)	$16,000 ea.
• Furniture, tools, safety equip. etc.	$15,000/site
3. SITE PREPARATION / CONSTRUCTION	
• Permit fees	varies with locale
• Site preparation	$1,000–5,000
• Building constr./renovation	Variable
4. STAFF TRAINING	
In-house or professional services	$10,000/10 staff

ON-GOING COSTS

1. STAFFING & ADMINISTRATION
2. INSURANCE
3. ADVERTISING
4. SUPPLIES
5. HAULING / DISPOSAL
6. DEPRECIATION / AMORTIZATION

1. STAFFING & ADMINISTRATION

	(Santa Clara Co. CA)
Program Manager (full time)	$60,000
Clerical Support (full time)	30,000
On-Site Labor (for each 100 cars) 10 staff x 8 hrs @$30	2,400
On-Going Staff Training $5,000/10 staff	5,000

On-Site labor/100 cars = $2,400

Equivalent On-Site Labor Cost = $24 per car

2. INSURANCE

1. MINIMUM $1 Million General Liability
2. SELF-INSURANCE
   (CITY, COUNTY, SPECIAL DISTRICT)
3. PROVIDED BY CONTRACTOR
   (Local jurisdiction included as additional insured parties)

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3. ADVERTISING

ESTIMATES PER 1,000 UNITS:	
UTILITY BILL INSERTS	$10–15
FLYERS & HANDOUTS	$30–60
BULKRATE or ADVERTISING MAILERS	$130–200
DIRECT MAIL	$120–450
DOOR TO DOOR DISTRIBUTION	$30–550

4. SUPPLIES

Estimates per 100 Cars (assuming 10 staff):		(Santa Clara Co. CA)
55-Gallon Drums	18 drums @$25	$450
Absorbent Material	50 bags @$2.75	137
Gloves (2pr/staff)	20 pair @3	60
Tyvek Suits (2pr/staff)	20 pair @4	80
Total Cost/100 cars		$700

Equivalent Cost = $7 per car

5. HAULING / DISPOSAL

Estimates per 100 Cars:		(Santa Clara Co. CA)
Pourable combustibles	5 drums @$240	$1,200
Lab-packs	6.7 drums @$185+$100	1,340
Latex paint (recovery)	100 gals @$3	300
Latex paint (incineration)	2.5 drums @$430	1,075
Aerosol cans	1 drum @$285	285
Lead-acid batteries	16 units @$0	0
Waste oil	200 gals @$0.25+$150	200
Total cost per 100 cars		$4,400

Equivalent Cost = $44 per car

DEVELOPING COST ESTIMATES

Number of Households in Target Service Area X Household Participation Rate (%) X HHW Generation Rate (drums, gallons or lbs) X HHW Disposal Costs ($/drum, gallons or lbs)

6. DEPRECIATION

1. DEPRECIATION OF EQUIPMENT (2–5 YEARS)
2. AMORTIZATION OF CAPITAL COSTS

SAMPLE COST WORKSHEET

SANTA CLARA COUNTY – 1990

ONE-TIME COSTS (ONE FIXED SITE):		
Planning	Contributed	—
Equipment	5 Hazbins @$16,000	$80,000
	Supplies	15,000
Site Prep	Concrete pads 5 @$1,100	5,500
Site Lease	To be arranged	?
Initial Training	10 staff persons	10,000
Total One-Time Costs		$110,500

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BUDGETS FOR HOUSEHOLD
HAZARDOUS WASTE PROGRAMS

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SAMPLE COST WORKSHEET

SANTA CLARA COUNTY (505,000 Hshlds)
(Est. participation rate @ 1.7% = 8,500 cars):

ON-GOING (ANNUAL) COSTS:

Staffing	**Program Manager (F/T)**	**$62,000**
	Clerical (F/T)	**30,000**
	On-site – 6,800 staff hrs @$30	**204,000**
Supplies	**8,500 cars x $7/car**	**59,500**
Disposal	**8,500 cars x $44/car**	**374,000**
Advertising	**=$20/1,000 units**	**10,000**
On-going training		**5,000**
Total On-going Costs		**$744,500**

SAMPLE COST WORKSHEET

SANTA CLARA COUNTY (505,000 Hshlds)
(Est. participation rate @ 1.7% = 8,500 cars):

Annual Costs:	**$744,500**
Amortization of One-time Costs ($110,500/5 years)	**22,100**
TOTAL ANNUAL COSTS	**$766,600**

Equivalent Cost Per Car = $90
Equivalent Cost Per Household = $1.52

SAMPLE COST WORKSHEET

KING CO. WASHINGTON – 1989 (565,000 Hshlds)
(Est. participation rate @ 2.0% = 12,000 cars):

ONE-TIME COSTS (ONE FIXED SITE):

Planning	Contributed	—

ON-GOING (ANNUAL) COSTS:

Staffing	Administrator (F/T)	$62,000
	Planner	17,200
	On-site – 4,100 staff hrs	140,160
Disposal/Supplies	Contractor	421,968
Advertising		26,357
Total On-going Costs		**$684,227**

Equivalent Cost Per Car = $57
Equivalent Cost Per Household = $1.21

SAMPLE COST WORKSHEET

SAN BERNADINO CO. CA – 1989

ONE-TIME COSTS (ONE FIXED SITE):

Planning	Unknown	?
Main facility	Trailer + 2 Hazbins	$30,000
Satellite sites	6 Hazbins	90,000
Initial Training	5-10 staff persons	?
Total One-Time Costs		**$120,000**

ON-GOING (ANNUAL) COSTS:

Staffing (5 FT), Disposal/Supplies, Advertising, (Self-insured)	425,000
Donated labor =equiv. 2.8 pers-yrs	140,000
Total On-going Costs	**$565,00**

SAMPLE COST WORKSHEET

SAN BERNADINO CO. CA (545,000 Hshlds)
(Est. participation rate @ 2.5% = 13,500 cars):

Annual Costs San Bernadino Co. & Cities (donated):	**$665,000**
Amortization of One-time Costs ($120,000/5 years)	**24,000**
TOTAL ANNUAL COSTS	**$689,000**

Equivalent Cost Per Car = $50
Equivalent Cost Per Household = $1.26

COMPARISON OF PROGRAMS

Program	Annual Cost	Cost/car	Cost/Hshld
Santa Clara Co.	766,600	90	1.52
King Co. WA	684,227	57	1.21
San Bernadino Co.	689,000	50	1.26
New facility with high capital costs low initial partic	500,000	120	1.80

Sources of Information on
Budgets for Household Hazardous Waste Collection Programs

One-day Collection Programs

Toxics Away! The Alameda County Pilot Collection Program for Small Generators of Hazardous Wastes, April 1988, 190 pages—Contains useful information for cities, public agencies, interest groups and individuals planning and evaluating small generator hazardous waste collection programs. Provides details on a pilot collection program in Alameda County (492,000 households), methodology for estimating disposal costs, as well as recommendations for future efforts. Also includes an overview of more than 80 collection programs conducted in the Bay Area between 1983 and 1988. Association of Bay Area Governments, P. O. Box 2050, Oakland CA 94604-2050. Catalog No. P88001HAZ Publications–(415) 464-7916.

Guidelines for Planning Household Hazardous Waste Collection Programs, May 1988, 70 pages—Provides valuable "how-to" information for cities, public agencies, interest groups and individuals planning and designing household hazardous waste collection programs. Highlights include options for waste handling and disposal, technical requirements, suggested publicity and education methods, and technical appendices. Association of Bay Area Governments, P. O. Box 2050, Oakland CA 94604-2050. Catalog No. P88002HAZ Publications–(415) 464-7916.

Permanent Collection Programs

Cost Information for County-wide Program Models, September 1990—Preliminary cost-estimation methodology and information on several county-wide permanent collection programs including the following:

- Cost estimates for San Bernardino County, CA (6 fixed sites, 1 hub) One-time and On-going costs including recycling of latex paint, waste oil, batteries and antifreeze, solvent-based paint incineration and an estimate for donated labor to operate the 5 satellite sites,

- Cost estimates for King County, WA (mobile program–24 sites, private TSD hub) On-going costs including recycling of waste oil, batteries and antifreeze, solidification and landfilling of latex paints in 1988-89, and lab-pack/landfill disposal of solvent-based paints,

- Operational cost estimates for planned Santa Clara County, CA program based on labor and materials estimates for each 100 cars/households arriving at collection site. Disposal costs are derived by multiplying number of cars/households scheduled for program by average of per car cost estimates. Estimation procedure is costed out for several alternatives of fixed and mobile sites.

Note: Santa Clara County cost estimates are based on cost information from HHW programs conducted by local jurisdictions in Santa Clara County. Estimates for a specific area should be based on participation rates from locally-conducted programs and site-specific and contractor-bid disposal costs. For further information on permanent program cost-estimation methodology, contact Pamela Hodgins, Santa Clara County Planning Department, Office of Toxics and Solid Waste Management, 1735 No. First Street, Suite 275, San José CA 95112 (408) 441-1195.

STATE AND LOCAL HHW PROGRAM FUNDING SOURCES

KATHLEEN WARREN, DIRECTOR
KANSAS HOUSEHOLD HAZARDOUS WASTE GRANT PROGRAM

This paper describes the wide variety and possibilities of funding sources for household hazardous waste programs at the state and local level of government around the States. The table at the end of the document is intended to be updated so that we can maintain an informal data base on what is happening. It is difficult to focus with accuracy on a moving target.

The movement toward dealing in an organized way with the problem of household hazardous waste began with citizen groups and local business funding. It has become more institutionalized in the last ten years with funding from local and state governments. The basic premise, however, is the same as when it began: citizens and government and often businesses are working together to perform an environmental service which is beyond the normal hazardous waste regulatory framework.

Funding sources at both the state and local levels are consequently more diverse than they would be if <u>all</u> hazardous waste were regulated; then, one might expect support at the federal and state levels of government for mandated local government programs to reduce or ban the flow of hazardous waste from sanitary landfills or improper disposal. What has occurred, instead, is that many local governments decided that citizen education on the purchase and use of household hazardous materials is important, and that proper disposal of household hazardous waste is important for the safe maintenance of sanitary landfills, and rivers or wells as quality water resources.

As might be expected, the majority of funding for local government programs has come from municipal solid waste budgets. These programs have also been funded by departments of public works, water and sewer, health departments, planning commissions and councils of government, fire departments, local emergency preparedness committees, farm bureaus and extension services, and user fees. In addition, the USEPA has, in a few cases, reduced hazardous waste or water quality fines against cities or companies if they agree to conduct temporary programs.

In general, temporary programs have been supported at the local level from unused "pockets" of monies in established, ongoing program budgets. When HHW collection becomes institutionalized on an annual basis, it is often because other environmental issues have become important such as the need for water supply, a landfill closure crisis or a city wide recycling effort. Because additional and continuing sources of funding have become necessary for these purposes, household hazardous waste collections may receive a portion of that funding which is generally in the form of a surcharge on solid waste tipping fees or water and sewer bills. An

annual budgetary commitment of previous agency funding sources to continue a HHW collection effort also has occurred.

The imposition of a surcharge or fee can be a politically risky venture for governments, and if a city is lucky enough to have no immediate environmental threat, a new fee or surcharge may be difficult to obtain.

At the state government level, agencies and legislatures typically begin with pilot collection programs to study the impact of state dollars on local governments and populations. These programs have usually been funded with state general funds through state agencies such as departments of natural resources or environment. Kansas and New Hampshire tapped state superfund budgets for their initial efforts. Oil overcharge funds have also been used.

The same pattern of institutionalization seems to be occurring at the state as well as the local level of government. Surcharges on environmental services or hazardous products of concern, special environmental bond issues, trust funds, or otherwise environmentally dedicated fund revenues have been used. The following paragraphs give a few examples.

In Kansas, the 1986 pilot program was funded with state superfund monies, in 1990 grants were from state general funds and in 1991 from the new state water plan fund. The Kansas Water Office (an umbrella planning agency) had developed plans for the solutions to water quality problems, by river basin, for many years. Those plans were implemented by individual state agencies and local "Basin advisory committees" or local governments as their budgets would allow. In 1989 the State Legislature established a funding mechanism for the plan which funded programs in a variety of state environmental agencies. Fees were assessed against retail and industrial water use and stockwatering usage (irrigation was exempt), inspection fees on fertilizer and agricultural chemicals registered in the state, and environmental penalties. Lottery revenue funds and state general funds were also a part of the Water Plan Funding. Of the approximately $16 million collected in 1990, $150,000 was allocated for household hazardous waste collection grants to local governments.

Florida established the Water Quality Assurance Trust Fund in 1983. The enabling legislation had components dealing with cleaning up hazardous waste sites, emergency response operations, rehabilitation of contaminated drinking water supplies, creating amnesty days, and establishing educational programs for citizens on the proper management of hazardous waste. Initial funding came from an $11 million transfer from the $35 million Florida Coastal Protectional Trust Fund. The Florida Coastal Protection Fund cap was raised to $50 million and 1/2 of the annual interest was to be transferred into the new WQATF. Also, monthly transfers of interest from the state's Water Pollution Control Trust Fund (the state's wastewater treatment plant grant program) were put into the new WQATF. Additionally, a 2-cent per barrel excise tax on

pollutants was passed that would be collected if the fund fell below $3 million. This tax would be raised to 5-cents per barrel when the balance in the fund was not sufficient to pay any proven costs. Pollutants were defined as: petroleum products, pesticides, ammonia, and chorine. By 1988 the fund was being rapidly depleted, and interest from the other funds, which provided the main source of revenue, was declining. A maximum 5-cent per barrel tax was imposed. In 1988 and 1989 the Legislature expanded the list of pollutants and passed additional fees on batteries, solvents, motor oil and lubricants.

Iowa's Groundwater Protection Fund has utilized $891,786 of its $26,322,741 in revenues to fund household hazardous waste programs around the state. In addition, the fund has been used to fund storage tank, agricultural management, oil overcharge and solid waste expenditures. The Fund receives revenue from the lottery, retail permits from stores which sell environmentally polluting products ($25 per store), pesticide license fees, product registration and nitrogen fertilizers.

In 1985 Washington amended its Hazardous Waste Management Act and funding was provided in 1987. Local household hazardous waste programs had already been instituted, and they were now allowed the possibility of a 50% state match. Funds are raised by a tax on the first sale of a hazardous product.

Michigan voters approved the issuance of an $800 million "Quality of Life" bond issue. Of that amount, $150 million is to be used for waste management, including household hazardous waste programs, around the state. Originally HHW funds were used for collection days or permanent programs. Now, all funding is for the establishment of permanent facilities. Each site can obtain up to $100 thousand over an 18 month period.

California programs were primarily funded with local monies until the Solid Waste Management Board imposed a state surcharge on solid waste collections. Some of these funds are returned to local government to fund their own programs. In addition, the Board is establishing a discretionary grant program which will reimburse up to 20% of the cost of a HHW program to a maximum of $120,000 per grant.

Minnesota also has imposed a tax on solid waste service (6%) which is returned to local governments for their use. The state's household hazardous waste program was originally funded with state general funds.

This discussion only a skims the surface of the possibilities at both the state and local levels of funding for household hazardous waste collection and education efforts. For further details about individual programs please contact the state representatives in "Household Hazardous Waste Management News" who continually provide information on their state.

STATE AND LOCAL FUNDING SOURCES
(Unscientific Survey)

Highlighted line indicates state funding sources.
Second line is local government funding

Region I

CT State Match SGF up to 50% > 10% > 0%
water dist., water auth. & COG, private business

MA SGF grants/ > 0%
paint store, TV station, Farm Bureau

NH HW cleanup fund, from oil overcharge funds, per capita grants
SW Dist., Reg. Planning Commission

RI SGF

VT State SW mgt. fund ($.24 1/2 cents per capita), SGF

Reg. Planning Dist. (state $), SWM Dist.

ME SGF
waste mgt., city - Naval shipyard

Region II

NJ State SW tipping fee (SW Serv. tax to fund 100% of collection)
SW management

NY No state $/TA only
public works $, univ.-school consortium

PA St. Mun. SW fund, SGF HHW fund - no $ in it
SWM Authority

Region III

MD No state $
public works

OH No state $
media, contractor, city agency, business

VA No state $
Public Service Authority

DE SGF

WV No state $

Region IV

FL Amnesty day $2M, ctr. grants,$1M, Water Quality Assurance Trust Fund
$2 surcharge on property taxes (annual) $250K

NC St., solid waste trust fund
water and sewer surcharge

AL No state $
SW tipping fees, contractors

SC No state $
LWV, Chamber of Commerce, Ext. Service, city agency

Region V

IA Lottery, retail permit $25 per store, state grant
"local support" (solid waste budget)

MI SGF, (100%) grant funds, Quality of Life Bond matching grant funds
local agency

MN MPCA matching funds, 6% tax on SW disposal
local agency

WI SGF, DNR 100%
local 100% solid waste

NE No state $, Public education
local agency

SD No state $, Bill for 100% pilot by Dept. of Water & Nat. Resources
no $

Region VI

IL SGF for pilots
no match 6 communities selected

IN
DPW, local SW funds

KS 100% pilot state SF, 50-50 grants SGF, Kansas Water Plan funding
SW tipping fee, public works, Emergency Preparedness Committee, Health Department, EPA fine reduction

MO SGF up to $65,000
above that, local match

KY No state $
city/county sewer dist. (water bill surcharge), business

Region VII

LA No state $
contractor, business

OK No state $
contractor, business

TX No state $
SW tipping fees, contractor, Civic Groups, industry

AR New state $
fire dept., SW

MS SGF, Education and outreach grants

Region VIII

AK SGF, State match
SW tipping fee, user fee, sewer and water rates, user fees (VSQG)

HI SGF
no match

ID No state $
county $

OR $.50 ton statewide tipping fee ($300 K/yr) 30% of $.50/ton for HHW

WA St. hazardous substances tax ($250 K grants + $500 K for pilots)
$35 state fee on each facility with potential to generate waste.
TV station, local agency

WY No state $
2 U.S. EPA fine reductions, local action

Region IX

CA State tipping fee ($20 M in 2 yrs) to fund match
sanitation, env. health, water, public works, contractor

AZ HHW generating products tax (State Superfund)
local surcharge hazardous material

CO No state $
local Nat. Resources Dept., $10.00/lb user fee

NM No state $
Environmental Health

UT No state $
City/County Health Dept., $.25/ton tipping fee

NV No state $

CHARACTERIZATION OF PRODUCTS CONTAINING MERCURY IN MUNICIPAL SOLID WASTE IN THE UNITED STATES

Marjorie A. Franklin
Franklin Associates, Ltd.

INTRODUCTION

The Municipal Solid Waste Program, U.S. Environmental Protection Agency, has commissioned a study, being performed by Franklin Associates, Ltd., to characterize products containing mercury in municipal solid waste in the United States over the time period 1970 to 1989, with projections to the year 2000.

The draft report is due to be submitted to EPA by the end of November 1990. The final report should be out early in 1991, following review and comments by EPA and peer reviewers. Because the report is now being finalized, I will not report any tonnages or percentages in this paper. I will, however, report on the products containing mercury that have been identified in the course of the study.

STUDY METHODOLOGY

This study employs the material flows methodology, which has been used to characterize municipal solid waste (MSW) for EPA since the 1970s. Briefly summarized, the material flows methodology begins with domestic production of products and adjusts for imports, exports, losses during the manufacturing process, and lifetime of products to determine annual generation of products entering MSW. Where appropriate, estimates are made of recovery of products. The difference between generation and recovery is the discards of products to combustion, landfill, or other disposal.

While this methodology has customarily been used to characterize the entire municipal solid waste stream, it was used to characterize lead and cadmium in MSW in 1989. The mercury study is very much like that report.

One of the difficulties with any characterization of this kind, especially when focusing on a relatively small part of MSW like mercury, is determining which products are part of the municipal solid waste stream. Mercury is used in many products and applications that do not meet the traditional definition of municipal solid waste used by EPA. An example would be remnants of paint containing mercury discarded in a can along with other household waste. The can meets the traditional definition of MSW as characterized by the material flows methodology; the paint does not. The mercury-containing paint would, however, be defined as household hazardous waste.

For this study, we have attempted to follow the usual definition of MSW in classifying products containing mercury. Since there is so much interest in eliminating mercury from the waste stream, we have also paid considerable attention to identifying all uses of mercury. The report will include separate chapters on MSW and non-MSW uses of mercury.

HOUSEHOLD BATTERIES

It seems clear that household batteries are the principal source of mercury in MSW. Most of the mercury in household batteries is in two types of battery: alkaline and mercury zinc.

Alkaline Batteries are the most common type of household battery. The typical cylinder battery in various sizes is used in flashlights, toys, appliances, radios, etc. Button sized alkaline batteries are used in watches and digital thermometers. Mercury in alkaline batteries is present to deter corrosion and inhibit hydrogen buildup that could cause cell rupture. Although the amount of mercury in an alkaline battery is quite small, large numbers of alkaline batteries are sold and disposed every year, so they have been an important source of mercury in MSW.

The battery industry has made a commitment to decrease or perhaps eliminate mercury from alkaline batteries.

Mercury Zinc Batteries are the other important source of mercury in batteries. These batteries contain a relatively high percentage of mercury in each battery. Mercury zinc button batteries are used in hearing aids, watches, calculators, cameras, smoke detectors, and many other applications. There also are cylinder type mercury zinc batteries, which are often used in medical and military applications.

Other Batteries that contribute relatively minor sources of mercury include:

- Carbon zinc batteries (tape recorders, alarms systems)
- Silver oxide button batteries (watches, hearing aids)
- Zinc air button batteries (similar to mercury zinc; longer life and more expensive).

ELECTRIC LAMPS

There are two souces of mercury from electric lamps (bulbs): fluorescent lamps and miscellaneous electrical discharge (MED). We estimated that these sources contribute approximately equal amounts of mercury to MSW.

We found that all fluorescent lamps contain mercury, although the average mercury content has been reduced substantially over the past five years. By contrast, mercury is not present in all MED lamps, but it is in high-intensity discharge lamps such as mercury vapor, metal halide, and high pressure sodium. While the fluorescent lamps are used in homes and commercial/institutional applications (like offices and schools), the high-intensity lamps are more commonly used for outdoor lighting. We believe that nearly all of these lamps are discarded in MSW.

PIGMENTS

Mercury has a long history of use as a pigment, most often in reds and oranges. Mercury is often used in association with cadmium in pigments. While it appears to be impossible to quantify all the end uses of pigments containing mercury, we believe that the primary application is in plastics. Other uses of these pigments could include paints, enamels, printing inks, rubber, paper, and textile printing.

The pressures to remove heavy metals from pigments have caused U.S. producers to cease making cadmium-mercury pigments, but some are still imported.

THERMOMETERS

Fever thermometers are a source of mercury familiar to almost everyone. They are used in homes, physicians' offices, and hospitals. This is probably a declining source of mercury, as digital thermometers are replacing mercury thermometers, especially in the health care industry.

THERMOSTATS

Homes, offices, and institutional buildings typically have thermostats containing mercury, which probably are discarded into MSW (although if present in a building being demolished, they may become demolition waste).

There is a trend to replace thermostats containing mercury with programmable electronic thermostats, which do not contain mercury. While the programmable thermostats are more expensive, they are more energy-efficient.

DENTAL FILLINGS

There have been news stories lately about mercury in dental fillings (amalgams). We found typical amalgams are approximately 50 percent mercury by weight, although there are alternate materials now.

For economic reasons, it is common practice for dentists to recover excess amalgam for re-refining. We believe that dental mercury is not a large source of mercury in MSW, but some undoubtedly reaches the waste stream.

OTHER USES THAT COULD ENTER MSW

We identified at least two other uses of mercury that would end up in MSW. Both contribute very small amounts of mercury to MSW.

There is a specialized coating for a paper used when scanning off a cathode ray tube (e.g., in hospitals and some publishing). It is predicted that this use will be discontinued within a few years.

We also learned that mercury has been used in instant camera film pack batteries. This use was reportedly discontinued in 1988.

NON-MSW USES OF MERCURY

We identified a number of current uses of mercury that would not generally be classified as municipal solid waste. Those interested in the management of household hazardous wastes should, however, be alert to these products.

- Mercury is permitted in limited applications as a fungicide (e.g., on golf courses and for treatment of Dutch elm disease).
- Mercury use in latex paint has only recently been banned.
- Mercury is used as a catalyst for the manufacture of certain plastics (a catalyst does not, however, end up in the final product).
- Mercury is used as a cathode in the manufacture of chlorine and caustic soda.
- Mercury is used in certain military explosives.
- Mercury is used in laboratories (which are generally tightly regulated).
- Mercury is permitted in certain pharmaceuticals.
- Mercury is permitted in cosmetics used in the eye area.
- Mercury is used in mercury switches and electrical apparatus for industrial use.

PAST USES OF MERCURY

Mercury has been used in many products in the past; some of these could end up discarded in MSW or in household hazardous waste collections, though this is almost impossible to quantify. These uses include:

- Pesticides and fungicides. Use of mercury on food crops was banned in 1972, and there were further restrictions in 1978.

- Antifouling paints. Marine uses were banned in 1978.

- Explosives and fireworks. This use of mercury was discontinued before 1970.

- Mirrors. This use was discontinued about 50 years ago.

- Glass. Mercury appears to be used only in highly specialized applications in glass making.

- Treatment of felt. This use was discontinued in the 1950s.

- Embalming fluid. This use was apparently discontinued about 40 years ago.

- Photographic development. This use was apparently discontinued about 25 years ago.

- Soap. This use is no longer permitted.

- Slimicide in paper manufacture. This use was banned in food packaging in 1964. Banned along with other fungicide uses in 1978.

Battery Council International

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SPEECH OF RICHARD GODBER
FOR THE 1990 EPA
HOUSEHOLD HAZARDOUS WASTE CONFERENCE

Good afternoon, I am Richard Godber, President of Trojan Battery Company located in Santa Fe Springs, California. I am speaking to you today as a representative of the Battery Council International's ("BCI") Board of Directors.

First, allow me to provide some background on BCI. BCI represents over 250 member companies from throughout the world. BCI's members are engaged in the production of lead storage batteries for automotive, marine, industrial, stationary,

SPECIALTY AND COMMERCIAL USES. BCI'S MEMBERS ALSO INCLUDE COMPANIES ENGAGED IN THE RECLAMATION AND RECYCLING OF LEAD BATTERIES ONCE THEY ARE SPENT. BCI REPRESENTS MORE THAN 99 PERCENT OF THE NATION'S DOMESTIC LEAD BATTERY MANUFACTURING CAPACITY, AND APPROXIMATELY 92 PERCENT OF ITS BATTERY RECYCLING CAPACITY. BCI INCLUDES ALL OF THE LARGE, MULTI-PLANT DOMESTIC MANUFACTURERS AS WELL AS THE MAJORITY OF THE NATION'S SMALLER FIRMS.

BCI PRIMARILY WAS ESTABLISHED TO HELP SET INDUSTRY STANDARDS FOR LEAD BATTERIES. IN 1987, THE BATTERY COUNCIL EXPANDED ITS FOCUS TO INCLUDE THE ACTIVE PROMOTION OF LEAD BATTERY RECYCLING. IN FACT, IN BCI'S 7 PART MISSION STATEMENT, THE FIRST PART STATES THAT BCI WILL ACT "TO RESPONSIBLY AND SUCCESSFULLY ADDRESS THE ENVIRONMENTAL ISSUES FACING THE BATTERY INDUSTRY".

AS YOU MAY KNOW, LEAD BATTERIES ARE USED FOR STARTING, LIGHTING AND IGNITION SYSTEMS IN AUTOMOBILES, OTHER VEHICLES, AND MARINE SYSTEMS; ALSO USED TO POWER COMPUTERS AND HOUSEHOLD TOOLS; AND IN A VARIETY OF INDUSTRIAL APPLICATIONS.

IN 1988, OVER 85 MILLION LEAD BATTERIES WERE SOLD IN THE UNITED STATES FOR THESE AND OTHER USES. LEAD BATTERY USAGE ALSO IS GROWING. THIS IS DUE TO THE INCREASING CONSUMER DEMAND FOR ELECTRIC DEVICES, THE FUNDAMENTAL RELATIVE EFFICIENCY OF THIS POWER SOURCE AND, WE BELIEVE, THE RECYCLABILITY OF OUR PRODUCT. IN FACT, TO UNDERSTAND THE IMPORTANCE OF LEAD ACID BATTERIES FROM AN ENVIRONMENTAL ASPECT, CALIFORNIA'S CLEAN AIR RESOURCE BOARD HAS RECENTLY PASSED A REQUIREMENT THAT BY 1998, 2% OF ALL PASSENGER CARS IN CALIFORNIA MUST BE ELECTRIC, AND BY 2003, 10%, THAT EQUATES TO 200,000 ELECTRIC VEHICLES. THE MOST LIKELY POWER SOURCE WILL BE LEAD ACID BATTERIES THAT WILL NEED TO BE SUPPORTED BY A SOUND RECYCLING CHAIN.

HISTORICALLY, THE LEAD BATTERY INDUSTRY HAS RELIED UPON THE USE OF RECYCLED LEAD IN THE MANUFACTURE OF NEW LEAD BATTERIES. THE PRIMARY SOURCE OF THIS LEAD IS USED OR JUNK AUTOMOTIVE BATTERIES. IN CALIFORNIA ALONE, THERE ARE OVER 24 MILLION VEHICLES WHICH EQUATES TO APPROXIMATELY 8 MILLION SPENT LEAD ACID BATTERIES GENERATED EACH YEAR. A TYPICAL AUTOMOTIVE BATTERY IS MADE OF A RECYCLABLE PLASTIC CASING, RECLAIMABLE LEAD PLATES. AND POTENTIALLY REUSABLE SULFURIC ACID. THE TECHNOLOGY AND MARKETS EXIST TODAY TO ASSURE THAT THESE PRODUCTS ARE AND CONTINUE TO BE RECYCLED.

THERE ALREADY EXISTS A SOPHISTICATED AND VOLUNTARY BATTERY RECYCLING INFRASTRUCTURE. TYPICALLY, THESE LEAD BATTERIES ARE RETURNED BY CUSTOMERS TO BATTERY RETAILERS OR SERVICE STATIONS. BATTERY MANUFACTURERS, RECYCLERS OR SCRAP DEALERS THEN PICK-UP THE USED BATTERIES AND TAKE THEM TO SECONDARY LEAD SMELTERS FOR RECYCLING.

AT SECONDARY SMELTING FACILITIES, THE BATTERIES ARE SEPARATED INTO THEIR COMPONENT PARTS - PLASTIC, LEAD PLATES, AND SULFURIC ACID. THE ACID IS COLLECTED AND EITHER REUSED OR NEUTRALIZED. THE PLASTIC IS REMOVED FROM THE OUTSIDE OF THE BATTERY AND CHIPPED INTO PIECES AND SOLD FOR RECYCLING INTO SUCH PRODUCTS AS NEW BATTERY CASES. THE LEAD PLATES AND ASSOCIATED MATERIALS ARE SMELTED AND REFINED INTO NEW LEAD INGOTS. THE REFINED LEAD IS THEN USED TO MAKE NEW BATTERIES AND FOR OTHER PURPOSES.

FOR A VARIETY OF REASONS, A SPECIFIC BATTERY RECYCLING RATE IS DIFFICULT TO DETERMINE. THE U.S. ENVIRONMENTAL PROTECTION AGENCY ESTIMATES THAT APPROXIMATELY 80 PERCENT OF THE SPENT AUTOMOTIVE LEAD BATTERIES ARE RECYCLED. THE BUREAU OF MINES, HOWEVER, HAS STATED THAT THE RECYCLING RATE IS IN EXCESS OF 90 PERCENT. BASED ON THE EXPERIENCE OF OUR MEMBERS, BCI AGREES WITH THIS LATER ESTIMATE. 353

WHATEVER THE PRECISE NUMBER, HOWEVER, IT IS OBVIOUS THAT THE RECYCLING RATE IS HIGH. INDEED, AT 80 PERCENT THE RATE OF LEAD BATTERY RECYCLING IS 50 PERCENT GREATER THAN ALUMINUM CANS AND FIVE TIMES GREATER THAN GLASS BOTTLES.

NONETHELESS, SOME MODEST PERCENTAGE OF BATTERIES DO ESCAPE RECYCLING. TO ADDRESS THIS CONCERN, BCI HAS BEEN ACTIVELY PROMOTING LEGISLATIVE INITIATIVES TO ENCOURAGE BATTERY RECYCLING THAT DO NOT IMPOSE UNDUE COSTS ON CONSUMERS, MANUFACTURERS, DISTRIBUTORS OR RETAILERS.

SPECIFICALLY, IN 1988 BCI DEVELOPED MODEL BATTERY RECYCLING LEGISLATION WHICH WE HAVE ADVANCED - AND CONTINUE TO ADVANCE - THROUGHOUT THE STATES AND AT THE FEDERAL LEVEL.

(OVERHEAD - MODEL LEGISLATION)

THE KEY CONCEPT UNDERLYING BCI'S MODEL IS THAT THE CURRENT BATTERY RECYCLING RATE, BE IT 80 PERCENT OR HIGHER, IS BASED ON AN ALREADY EXISTING SOPHISTICATED AND VOLUNTARY BATTERY RECYCLING INFRASTRUCTURE. CURRENTLY, HOWEVER, NOT ALL OF OUR NATION'S BATTERY RETAILERS TAKE BACK USED BATTERIES, AND CONSEQUENTLY, NOT ALL CONSUMERS HAVE READY

ACCESS TO LOCATIONS THAT TAKE BACK THESE BATTERIES. IN ADDITION, MANY CONSUMERS ARE UNAWARE THAT LEAD BATTERIES ARE RECYCLABLE. BCI BELIEVES THAT LEGISLATION WILL BE MOST EFFECTIVE IF IT FOCUSES ON THESE KNOWN SHORTFALLS.

IF YOU WERE TO READ THROUGH THIS, YOU"D FIND THAT BCI'S MODEL SPECIFICALLY PROHIBITS LEAD BATTERIES FROM BEING DISCARDED IN THE TRASH, AND REQUIRES ALL PERSONS WHO SELL BATTERIES, INCLUDING RETAILERS, DISTRIBUTORS AND MANUFACTURERS, TO TAKE BACK USED BATTERIES. AN ADDITIONAL IMPORTANT COMPONENT IS THAT OF CONSUMER EDUCATION. IN THIS REGARD, BCI'S MODEL ALSO INCLUDES A REQUIREMENT THAT PERSONS WHO SELL BATTERIES MUST POST POINT-OF-SALE SIGNS WHICH STATE: IT IS ILLEGAL TO DISCARD LEAD BATTERIES IN THE TRASH; RECYCLE LEAD BATTERIES; AND STATE LAW REQUIRES US TO ACCEPT USED LEAD BATTERIES FOR RECYCLING.

(OVERHEAD OF STATES)

TO DATE, 27 STATES HAVE ENACTED PROHIBITIONS ON THE DISPOSAL OF LEAD BATTERIES IN THE MIXED MUNICIPAL SOLID WASTE. 24 OF THESE STATES HAVE GONE BEYOND THIS PROHIBITION TO ALSO ENACT MANDATORY TAKE-BACK REQUIREMENTS SIMILAR TO THOSE IN BCI'S MODEL. OF THESE 24, ONLY 7 STATES ALSO HAVE INCLUDED A MONETARY INCENTIVE, WHICH COMMONLY IS RE-FERRED TO AS A DEPOSIT IN LIEU OF A TRADE IN. BCI PLANS

TO CONTINUE WORKING WITH STATE LEGISLATURES UNTIL ALL 50 HAVE ENACTED BATTERY RECYCLING REQUIREMENTS.

AS AN OUTGROWTH OF ITS EFFORTS AT THE STATE LEVEL, BCI DECIDED THAT, AS OF JUNE, 1991, ALL LEAD BATTERIES WILL VOLUNTARILY BE LABELED WITH THE INTERNATIONAL RECYCLING SYMBOL (THE THREE CHASING ARROWS) AND THE MESSAGE "LEAD/RETURN/RECYCLE."

(OVERHEAD OF SYMBOL)

BCI SEES THIS AS AN IMPORTANT ADDITIONAL EDUCATIONAL TOOL THAT ALSO WILL HELP PROMOTE BATTERY RECYCLING.

BCI ALSO HAS ADVANCED ITS APPROACH AT THE FEDERAL LEVEL. THIS YEAR, 5 BILLS INTRODUCED IN THE HOUSE AND SENATE, AND THE ADMINISTRATION'S DRAFT POLLUTION PREVENTION BILL, INCLUDED MANDATORY TAKE-BACK REQUIREMENTS SIMILAR TO BCI'S MODEL. THESE BILLS EITHER WERE INTRODUCED IN THE CONTEXT OF RCRA REAUTHORIZATION OR THE RECENT DEBATE ON REDUCING THE INTRODUCTION OF LEAD INTO THE ENVIRONMENT. NONE OF THESE BILLS PASSED THIS YEAR. HOWEVER, CONGRESS IS EXPECTED TO TURN ITS ATTENTION TO RCRA REAUTHORIZATION NEXT YEAR, AND BCI IS CONFIDENT THAT ENACTMENT OF MANDATORY BATTERY RECYCLING REQUIREMENTS WILL BE APART OF THAT DEBATE.

BCI understands that regardless of the state or federal legislation, waste haulers and landfill or incinerator operators do find some lead batteries in the waste stream. BCI wants those batteries returned to the recycling chain. BCI strongly encourages solid waste managers to set lead batteries aside if and when they are found, and contact a secondary smelter, battery manufacturer or a scrap dealer, to pick them up for recycling. Information on the nearest recycling source can be obtained from speaking with the local environmental officials or by calling BCI's administrative offices in Chicago.

BCI supports other systems that also ensure batteries do not enter the municipal waste stream.

For example, the city of Milwaukee, Wisconsin has designated community drop-off centers for lead batteries which are picked up by a battery manufacturer and taken for recycling. Additionally, some solid waste haulers in the Reading, Pennsylvania area use trash trucks with compartments for lead batteries. This allows for the separation and management of lead batteries at the curbside. BCI believes that the largest return of lead batteries will be achieved with the least burden imposed on consumers and municipalities if systems such as these are coupled with mandatory take-back requirements.

BCI will continue to promote mandatory battery recycling requirements at both the state

AND FEDERAL LEVEL, AND ENCOURAGE THE IMPLEMENTATION OF PROGRAMS SUCH AS THOSE I HAVE JUST DESCRIBED. SOME OTHER PROGRAMS BCI IS CURRENTLY REVIEWING PERTAINS TO PUBLIC AWARENESS OF BATTERY RECYCLING WHICH GOES ALONG WITH THIS CONFERENCE'S THEME FOR SAFE AND EFFECTIVE MANAGEMENT OF HOUSEHOLD HAZARDOUS WASTE. THIS WOULD ENTAIL MEDIA AND RADIO TIME ALONG WITH THE POSSIBLE ESTABLISHMENT OF A NATIONWIDE 800 NUMBER THAT DEALS WITH QUESTIONS ON THE DISPOSAL OF SPENT BATTERIES. BCI ALSO IS ORGANIZING EFFORTS TO BETTER ACCOUNT FOR THE ACTUAL RECYCLING RATES OF SPENT LEAD ACID BATTERIES IN THE U.S. BCI SUPPORTS REQUIREMENTS AND PROGRAMS THAT CLOSE WHATEVER GAP REMAINS IN THE RECYCLING CHAIN, AND WILL ATTEMPT TO ACCOMPLISH THIS GOAL EFFICIENTLY AND AT THE LEAST COST TO BATTERY MANUFACTURERS, DISTRIBUTORS, RETAILERS AND CONSUMERS.

THANK YOU FOR ASKING ME TO SPEAK HERE TODAY. I WOULD BE HAPPY TO ANSWER ANY QUESTIONS YOU MAY HAVE.

Battery Council International Proposed Model Battery Recycling Legislation

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF _____

Section 1. LEAD ACID BATTERIES; LAND DISPOSAL PROHIBITED.

(a) No person may place a used lead acid battery in mixed municipal solid waste, discard or otherwise dispose of a lead acid battery except by delivery to a battery retailer or wholesaler, or to a secondary lead smelter, or to a collection or recycling facility authorized under the law of (state) or by the U.S. Environmental Protection Agency.

(b) No battery retailer shall dispose of a used lead acid battery except by delivery to the agent of a battery wholesaler or a secondary lead smelter, to a battery manufacturer for delivery to a secondary lead smelter, or to a collection or recycling facility authorized under the law of (state) or by the U.S. Environmental Protection Agency.

(c) Each battery improperly disposed of shall constitute a separate violation.

(d) For each violation of this section a violator shall be subject to a fine not to exceed $_____ and/or a prison term not to exceed _____ days (as appropriate under state code).

Section 2. LEAD ACID BATTERIES, COLLECTION FOR RECYCLING.

(a) A person selling lead acid batteries at retail or offering lead acid batteries for retail sale in the state shall:

(1) accept from customers, at the point of transfer, used lead acid batteries of the type and in a quantity at least equal to the number of new batteries purchased, if offered by customers; and

(2) post written notice which must be at least 8½ inches by 11 inches in size and must contain the universal recycling symbol and the following language:

(i) "It is illegal to discard a motor vehicle battery or other lead acid battery."

(ii) "Recycle your used batteries."; and

(iii) "State law requires us to accept used motor vehicle batteries or other lead acid batteries for recycling, in exchange for new batteries purchased."

Section 3. INSPECTION OF BATTERY RETAILERS.

The (appropriate state agency) shall produce, print, and distribute the notices required by Section 2 to all places where lead acid batteries are offered for sale at retail. In performing its duties under this section the division may inspect any place, building, or premise governed by Section 2. Authorized employees of the agency may issue warnings and citations to persons who fail to comply with the requirement of those sections. Failure to post the required notice following warning shall subject the establishment to a fine of $_____ per day (as appropriate under state code).

Section 4. LEAD ACID BATTERY WHOLESALERS.

Any person selling new lead acid batteries at wholesale shall accept from customers at the point of transfer, used lead acid batteries of the type and in a quantity at least equal to the number of new batteries purchased, if offered by customers. A person accepting batteries in transfer from a battery retailer shall be allowed a period not to exceed 90 days to remove batteries from the retail point of collection.

Section 5. ENFORCEMENT.

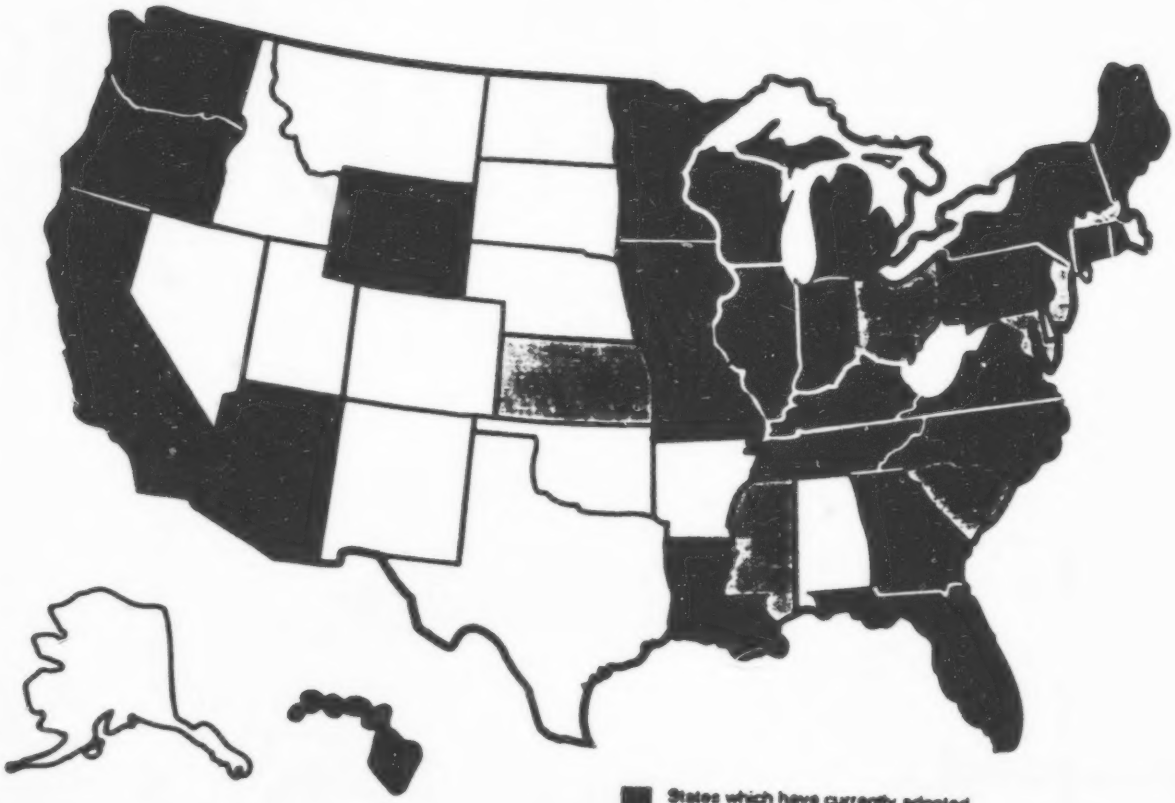
The (appropriate state agency) shall enforce Section 2 and 4. Violations shall be a misdemeanor under (applicable state code).

Section 6. SEVERABILITY.

If any clause, sentence, paragraph or part of this chapter or the application thereof to any person or circumstance shall, for any reason, be adjudged by a court of competent jurisdiction to be invalid, such judgment shall not affect, impair, or invalidate the remainder of this chapter or its application to other persons or circumstances.

Battery Council International • 111 E. Wacker Drive • Suite 600 • Chicago, IL 60601 • 312/644-6610

Legislation Development


States which have currently adopted "junk battery" legislation
States which are currently considering adopting "junk battery" legislation

SUMMARY OF ENACTED LEGISLATION

STATE/ COUNTY	EFFECTIVE DATE	BCI MODEL	DEPOSIT[a] TRADE/ALL	SPLIT OF DEPOSIT	DEPOSIT GRACE PERIOD	POINT OF SALE SIGN[b]
Arizona[c]	9/27/90	No	$5 (T)	100% Retailer	30 days	Retailer
California	1/1/89	Yes				No
Connecticut[d]	10/1/90	No	$5 (T)	100% Retailer	30 days	Retailer
Florida	1/1/89	Yes				No
Georgia	1/1/91	Yes				Retailer
Hawaii	1/1/90	Yes				State
Illinois	9/1/90	Yes				Retailer
Indiana	1/1/91	Yes				Retailer
Iowa	7/1/90	Yes				Retailer
Kansas City[e], Missouri	3/14/90	Yes				Retailer
Kentucky	7/13/90	Yes				Retailer
Louisiana	9/1/89	Yes				Retailer
Maine	10/30/89	No	$10 (T)	100% Retailer	7 days	State
Massachusetts	12/31/90	No[h]				
Michigan[f]	4/1/90	Yes				State

SUMMARY OF ENACTED LEGISLATION (cont.)

STATE/ COUNTY	EFFECTIVE DATE	BCI MODEL	DEPOSIT[e] TRADE/ALL	SPLIT OF DEPOSIT	DEPOSIT GRACE PERIOD	POINT OF SALE SIGN
Minnesota[g]	10/2/89	No	$ 5 (T)	100% Retailer		State
Missouri	1/1/91	Yes				State
New Hampshire	1/1/91	Yes[h]				No
New York	1/1/91	No	$ 5 (T)	100% Retailer	30 days	Retailer
North Carolina	1/1/91	Yes				No
Oregon	1/1/90	Yes[i]				Retailer
Pennsylvania	7/26/89	Yes				State
Rhode Island[j]	1/1/89	No	$5 (T)	80% State 20% Retailer	7 days	No
Tennessee	7/1/90	Yes[h]				No
Vermont	7/1/90	Yes[k]				No
Virginia	7/1/90	Yes				State
Washington	7/23/89	No	$5 (T)	100% Retailer	30 days	State
Wisconsin	1/1/91	Yes[l]				State
Wyoming	6/8/89	Yes				State

Model Legislation for Nickel Cadmium and Small Lead Battery Recycling

William T. Hill

GOOD AFTERNOON!

I am here today not only representing Black & Decker which is a global manufacturer of power tools, household appliances and many other consumer and commercial products, but also as a member of the Board of Directors for the Battery Products Alliance (BPA).

I have two objectives today. The first is to reinforce the nickel cadmium battery industry's commitment to preserving and, in fact, improving our nation's environment. The second is to outline the issues associated with recycling nickel cadmium and small lead batteries and discuss our proposed model legislation that addresses these issues.

To demonstrate our industry's commitment to preserving the environment, we have created an organization composed of manufacturers and users of nickel cadmium batteries (more commonly known as Ni-Cd's) to address battery recycling. The BPA represents the major Ni-Cd and small lead battery manufacturers doing business in the U.S. and a large portion of companies selling products containing these batteries. This organization is called the Battery Products Alliance and is sponsored by the National Electrical Manufacturers Association (NEMA) (supported by its Dry Battery Section). This organization was created specifically to address environmental issues and has been working closely with legislatures throughout this country as well as in Europe for over two years. Our current focus is model legislation to address the issues concerning battery recycling. I would like to take this opportunity to share this legislation, and the reasoning behind it with you today.

In discussing model legislation for Nickel Cadmium and Small Lead Battery Recycling, let me make it clear that I am neither a lawyer, nor a legislator. My purpose today is simply to explain, in layman's terms, why the BPA drafted its model legislation as it did. Also, let me point out that this legislation is still in draft form and subject to changes until approved by the BPA members.

First, we felt it necessary to state clearly our finding and our purpose in proposing this model legislation. In our "FINDINGS" sub-section, we recognized the widespread benefits that batteries provide. We would like to emphasize that unprecedented improvements in health, safety, productivity, education, convenience, communication, information and recreation have been made possible through battery technology We also recognize the importance of safeguarding our environment and minimizing burdens on commerce and the economy.

The purpose of the model legislation is to keep small lead and nickel cadmium batteries out of municipal land fills and incinerators. Our goal is to minimize health concerns, landfill space requirements, and energy consumption in incinerators, while providing safe, convenient, and effective means for recycling these batteries and reusing the constituent materials.

We have separate model legislation for non-consumer and for consumer products to accommodate the practical differences between the two in solid waste handling. For example, most government agencies and industrial, communications or medical facilities use disposal services to collect solid waste whereas curbside pick-up is the standard method used by most municipalities for household waste. Our draft provides for the capture and recycling of nickel cadmium and small lead batteries, no matter how they enter the waste stream.

Let us now review the definitions covered in Section 2 of the model legislation. We define *"battery"* to include all shapes, sizes, and power ratings of sealed nickel-cadmium batteries, but only those small lead batteries that are used in non-vehicular applications and weighing less than 25 pounds. The Battery Council International (BCI) has developed model legislation, which has been adopted by several states, to cover vehicular batteries. Small lead batteries used in camcorders, power tools, and many other products are not covered under the BCI model legislation. We felt they should not be overlooked in recycling efforts and, therefore, included them in our proposal.

Defining a *"non-consumer"* (as opposed to a *"consumer"* product) is more difficult. A distinction is necessary, however, since the recycling methods differ. The definition of a non-consumer product is one not sold through consumer retail distribution. Examples include uninterruptable power supplies for mainframe computers, emergency lighting, battery-operated medical tools, back-up battery systems for radio or television broadcasts, police radios, defibulator batteries, and many more. A consumer product is any product that is sold for personal, family, or household use and is normally sold through consumer retail distribution. Examples of consumer products are cordless power tools, laptop computers, battery-powered razors, radio-controlled toys, cordless telephones, portable radios and televisions, video cameras, standard AA, AAA, C and D size nickel cadmium replacement batteries, and many more.

Under the heading of "PRODUCT REQUIREMENTS" in Section 3, we have recommended July 1993 as the effective date for this legislation to allow time for manufacturers to make any product design changes that may be necessary to comply with battery removability and marking requirements. At that date, batteries in a consumer product would have to be easily removed by the consumer, and batteries in non-consumer products would have to be removable. This implies that to remove batteries from non-consumer products may require special training or skills, due to the complexity of non-consumer products and their special applications. For both consumer and non-consumer products, the product and the battery itself would be labeled according to the International Standards Organization recycling symbol. Additionally, the package containing the product would be similarly labeled if it is a consumer product. Packaging labeling would not be required on non-consumer products, since the distribution channel for these products does not typically use packaging as point of sale information for the end user, and often uses the same package for products with and without batteries. In all cases, the instruction manual would include information explaining the recycling symbol and methods to assure proper disposal of the batteries. We have left an appeal option available to those manufacturers who feel that they cannot, in good faith, comply with these product requirements.

"RECYCLING METHODS", discussed in Section 4, differ considerably between consumer and non-consumer products. For non-consumer products, we have placed the responsibility for proper disposal of nickel cadmium and small lead batteries predominately on the end user or the distributor of these products. Government agencies and industrial, communications, or medical facilities normally contract for waste disposal services and, therefore, have alternate choices and capabilities for controlling their waste or can return batteries to the distributors who initially sold them the battery-operated product. We have allowed other recycling options, however. For example, a manufacturer of a non-consumer product may elect to collect the batteries through its own service organization.

In collecting batteries from consumer products, we feel the average citizen is most likely to participate in a collection and processing system that maximizes convenience. This could include curbside pickup in special recycling containers, or convenient regional processing centers established by local municipalities for battery collection along with existing solid waste collection facilities. We are confident that this method would be safer, more efficient, and more cost effective than any other system. This would include cash deposits at the time of purchase, or returning the batteries to a consumer retailer who typically does not have the facilities or

knowledge for safe processing of the batteries. In all cases, we place the responsibility for initiating the recycling process on the user of the product. Consumer retail and drop box collection in Germany and Japan respectively, have both had very poor response rates - less than 20%.

Our "PENALTY AND EXEMPTION" section calls for civil penalties not exceeding $100 for each day noncompliance continues following notification by the State for failure to meet the product or recycling requirements. A person who violates the recycling system for consumer products would be liable for a civil penalty up to $100 per violation.

A person that complies with his or her part of the recycling effort would not be liable for improper disposal by any other person further along in the recycling process. Also, anyone involved in the process of collecting or transporting these batteries for recycling would be exempted form hazardous material handling requirements.

Finally, in the "APPLICATION" section, we wanted the provisions of this model legislation not to be retroactive to the effective date, so that existing inventories would not have to be reworked or undue burdens be placed on distribution.

In conclusion, I know that this group in particular fully appreciates the complexities associated with recycling of nickel-cadmium and small lead batteries. This model legislation is a sincere effort to address the concerns of all parties involved, and I hope that you agree that it is realistic and appropriate.

To make this, or any other legislation on battery recycling work, however will require a long-term communication and education program by each municipality involved.

Thank you for your attention.

I will be happy to try to answer any questions you might have.

BATTERY PRODUCTS ALLIANCE

MODEL LEGISLATION FOR RECYCLING OF NICKEL-CADMIUM

AND SMALL LEAD BATTERIES AS USED IN NON-CONSUMER PRODUCTS

Be it enacted by the State of _____:

SECTION 1: (FINDINGS AND PURPOSE)

A. FINDINGS

1) Batteries have come to play an important role in the advancement of social, medical, and economic concerns.

2) It is important to advance environmental interests without unnecessary interference with, or complications of, local, interstate, and international commerce to the detriment of our state's economy.

3) It is important to provide clear, safe, and practical guidelines to our state's citizens, businesses, and governmental bodies.

4) There are inherent differences in batteries and products using batteries with respect to their composition, distribution, and application.

5) It is in the public interest to recycle certain types of batteries and, on balance, not in the public interest to recycle other types of batteries.

B. PURPOSE

1) To provide for the management of lead and cadmium in the waste stream with specific reference to non-vehicular batteries and in a manner minimizing safety hazards that might result from unnecessary or inappropriate concentration of batteries in the waste stream.

2) To maximize consumer acceptance and convenience in accomplishing important objectives of environmental protection.

3) To minimize unnecessary administrative expense to the state, and avoid undue burdens on the state's consumers, retailers, manufacturers, and suppliers.

SECTION 2: (DEFINITIONS)

A. "BATTERY"

Refers both to single and multiple cells whether or not they are enclosed in a housing as a battery pack. "Nickel-Cadmium battery" means any rechargeable battery containing a nickel electrode and a cadmium electrode. "Small lead battery" means lead batteries used in non-venicular applications and weighing less than 25 pounds.

B. "NON-CONSUMER PRODUCT"

Any product which is sold primarily for use by a government agency, or an industrial, communications, or medical facility, or commercial enterprise and which is not sold through consumer retail distribution.

C. "RECYCLE"

The process of removing nickel-cadmium and small lead batteries from the waste stream through collection, transportation, and reclamation.

D. "DISTRIBUTOR"

Includes all sellers of batteries.

SECTION 3: (PRODUCT REQUIREMENTS)

A. On and after July 1, 1993, no person shall sell or offer for sale in this state any non-consumer product which contains a nickel-cadmium or small lead battery unless:

1) the battery can be removed or is contained in a battery pack that is separate from the product;

2) the product and the battery itself are labeled in a manner to meet the requirements of the International Standards Organization (ISO 7000-1135) recycling symbol with the chemical composition "Cd" for Nickel-Cadmium batteries, or "Pb" for small lead batteries included as part of the recycling symbol;

3) the instruction manual for the product includes information explaining the recycling symbol and methods to assure proper disposal of the batteries.

B. The commissioner of (appropriate regulatory agency) may authorize the sale of a non-consumer product which does not comply with subdivision A(2) of this section if such product was available for sale on or before the effective date of this act and the commissioner determines that such product:

1) cannot reasonably be redesigned and manufactured by July 1, 1993; or

2) the redesign of such product to comply with subdivision A would result in significant danger to public health and safety.

SECTION 4: (RECYCLING METHODS)

On and after July 1, 1993, no person may place in mixed municipal solid waste a removable nickel-cadmium or small lead battery that was used with a non-consumer product.

A. The following methods are acceptable for collecting, transporting, and processing used nickel-cadmium or small lead batteries:

1) the user or distributor may contract with the local municipal collector or authorized scrap dealer or transporter to collect, transport, and recycle such batteries: and/or

2) the user or distributor may contract with an authorized regional or national transporter/broker to collect, transport, and recycle such batteries; and/or

3) the user may contact the distributor of such batteries who must accept batteries for recycling up to the number of batteries of the same type and brand which that distributor has sold. The distributor may contact the next level of distribution in like manner until the batteries are returned to the manufacturer for recycling.

B. Section 4(A) shall not be interpreted to exclude other acceptable recycling methods.

SECTION 5: (PENALTY AND EXEMPTION)

A. A person notified by the state that they are not in compliance with Sections 3 or 4 of this Act is liable to the state for a civil penalty in an amount not to exceed $100 per each day the noncompliance continues.

B. A person who complies with the requirements of Sections 3 and 4 is not liable for improper disposal by any other person.

C. Anyone collecting/transporting nickel-cadmium or small lead batteries for the purpose of recycling is exempted from hazardous material handling requirements.

SECTION 6: (APPLICATION)

Notwithstanding any provisions of this Act no actions or activities prohibited or regulated by this Act shall be affected by this Act if they occur prior to the effective date and any products manufactured prior to the effective date shall not be subject to the Act.

BATTERY PRODUCTS ALLIANCE

MODEL LEGISLATION FOR RECYCLING OF NICKEL-CADMIUM AND SMALL LEAD BATTERIES AS USED IN CONSUMER PRODUCTS

Be it enacted by the State of _____

SECTION 1: (FINDINGS AND PURPOSE)

A. FINDINGS

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B. "CONSUMER PRODUCT"

Any product which is sold primarily for personal, family, or household use and which is normally sold through consumer retail distribution.

C. "EASILY REMOVED"

"Easily removed" means something that is either detachable or readily removeable by the consumer with the use of common household tools (e.g., flat bladed or phillips head screwdriver) and which can be removed by the consumer without cutting or resoldering any wires.

D. "RECYCLE"

The process of removing nickel-cadmium and small lead batteries from the waste stream through collection, transportation, and reclamation.

SECTION 3: (PRODUCT REQUIREMENTS)

A. On and after July 1, 1993, no person shall sell or offer for sale in this state any consumer product which contains a nickel-cadmium or small lead battery unless:

1) the battery can be easily removed by the consumer or is contained in a battery pack that is separate from the product and can be easily removed from the product;

2) the product, the package containing the product and the battery itself are labeled in a manner to meet the requirements of the International Standards Organization (ISO 7000-1135) recycling symbol with the chemical composition "Cd" for nickel-cadmium batteries, or "Pb" for small lead batteries included as part of the recycling symbol;

3) the instruction manual for the product includes information explaining the recycling symbol and methods to assure proper disposal of the batteries.

B. The commissioner of (appropriate regulatory agency) may authorize the sale of a consumer product which does not comply with subdivision A of this section if such product was available for sale on or before the effective date of this act and the commissioner determines that such product:

1) cannot reasonably be redesigned and manufactured by July 1, 1993; or

2) the redesign of such product to comply with subdivision A would result in significant danger to public health and safety.

SECTION 4: (RECYCLING METHODS)

By July 1, 1993, each municipality in this state shall be responsible for establishing a local collection and processing system, or participate in a regional processing center for recycling of nickel-cadmium or small lead batteries contained in consumer products.

SECTION 5: (RESTRICTIONS)

On and after July 1, 1993 no person may place in mixed municipal solid waste an easily removable nickel-cadmium or small lead battery except as part of the collection system established under Section 4 of this Act.

SECTION: (PENALTY AND EXEMPTION)

A. A person notified by the state that they are not in compliance with Section 3 of this Act is liable to the state for a civil penalty in an amount not to exceed $100 for each day the noncompliance continues.

B. A person who violates Section 5 of this Act is liable to the state for a civil penalty in an amount not to exceed $100 per violation.

C. A person who complies with the requirements of Section 3 is not liable for improper disposal by any other person.

D. Anyone collecting/transporting nickel-cadmium or small lead batteries for the purpose of recycling is exempted from hazardous material handling requirements.

SECTION 7: (APPLICATION)

Notwithstanding any provisions of this Act no actions or activities prohibited or regulated by this Act shall be affected by this Act if they occur prior to the effective date and any products manufactured prior to the effective date shall not be subject to the Act.

SNOHOMISH COUNTY
PAINT DROP 'N SWAP COLLECTION AND EXCHANGE PROJECT
APRIL 28, 1990

Project Report and Evaluation

Written By Jack Wolfin, Senior Planner
Snohomish County Solid Waste Management Division

BACKGROUND

In planning for a permanent household hazardous management system, Snohomish County in 1989 began providing annual Household Hazardous Waste Round-Ups. The Round-Ups are an interim disposal option while a final plan and strategy are developed (final plan adoption will occur in the spring of 1991).

Data from the 1989 Round-Up indicated that paint constituted upwards of 65% of all waste collected. It was also determined that the volume and handling requirements for paint were the limiting factor in providing an efficient one-day collection event. Other collection programs have determined that upwards of 40% of all paint waste collected at a Round-Up is reusable (King County, City of Seattle). These factors were the driving force behind the decision to plan and implement a paint specific collection and exchange project in 1990.

The Snohomish County Paint Drop 'n Swap project was developed to meet the following objectives: maximum reuse of waste, reduce total amount of waste for actual disposal, reduce management costs and provide for a more efficient collection event, e.g. smaller lines, shorter waiting time for unloading. The paint project was also planned as part of a two part collection program which included a four-site household hazardous waste round-up on the following weekend. Secondary objectives of the project were to reduce the amount of paint collected at the HHW Round-Up and reduce the congestion due to paint handling.

PROJECT PLANNING

The Snohomish County project was based on a similar project undertaken in Montpelier, Vermont in 1989, however the Snohomish County project would be the first of its kind in Washington State and the largest ever planned. All estimates for participation were based on participation rates from the 1989 HHW collection event in Snohomish County.

The April 28, 1990 date was set partly to coincide with the events surrounding Earth Day 1990 and the availability of the Mariner High School parking lot in South Everett. This site was chosen based on its location, accessibility and size.

Project Planning Estimates:

Participating Vehicles	300
Waste Avg./Vehicle	15 gallons
Total Gallons	4500 gallons
Waste Exchanged	25% or approx. 1125 gallons
Total Drums for Disposal	100-135

The event was designed to accept all types of paint waste including solvents, thinners, wood preservatives and spray paint, however the above planning estimates include only oil-based and latex paint. It was determined early on that only oil-based and latex paints would be screened and made available for reuse. This was done to reduce the liability and complexity of having to screen items which could pose a higher health and safety risk during the screening process.

Staffing for the event was a combination of both County and local government and hired hazardous waste contractor staff. A hazardous waste contractor was hired to specifically handle all non-reusable paint, solvents and wood preservatives brought to the event, this included sorting, manifesting, packaging, labeling, transporting and final disposal of the waste. County and local government staff were responsible for traffic control, surveying participants, unloading vehicles, screening out SQG's and non-paint related items, pre-sorting paint, screening for reuse, transfering sorted paint to either the contractor or the exchange area and assisting in the exchange area.

County/Local Government Staff:

Traffic and Survey	-	6
HHW Screening	-	1
Unloaders	-	6
Presorting	-	2
Screeners	-	5
Shuttling	-	4
Exchange Assist.	-	2
Sub Total		26
Contractor Staff	-	18
Total		44

SITE OPERATIONS

The site was set up in "ferry lanes" (which could accommodate between 50 and 60 cars at one time) which fed into two processing lanes for the unloading of up to four vehicles at one time.

Once a car was in the processing area, an unloader would open the back of the vehicle and screen the waste for unknowns, other HHW, explosives or other non-acceptable wastes. After screening the waste the unloader would then load the acceptable materials into a shopping cart, close the back of the car or truck and transfer the waste to the presorting area. The presorting area consisted of one table for latex paint, one table for oil-based paint and two tables directly in front of the contractor for all other paint wastes. A screener checked to see if a can had a sufficient amount of paint in it to justify further screening, usually 1/3 gallon was needed. If it did not contain the minimum, the can was sent to the contractor; if it did, the screener opened the can and checked the paint for reuse. The can was then given to a transfer person to be taken into the exchange area where it was kept separate by paint type (oil-base and latex). At this point people were allowed to "shop" for free paint and remove it from the site for reuse. All paint was kept in its original container, no paint was bulked.

All areas except the unloading area were under tents, including the screening tables, transfer area, exchange and contractor packaging.

Tent Areas Used:	20'x20' Screening and Transfering
	20'x20' Exchange Area
	20'x20' Contractor Packaging

The hazardous waste disposal contract service was awarded to G.L. Construction, a local hazardous waste broker. The contractor was responsible for all unusable paint and solvent type wastes. These materials were packaged for processing or final disposal in the following manner:

• Oil-Based Paint	Lab-packed for Disposal
• Latex Paint	Lab-packed for Disposal
• Solvent and Thinners	Bulked for Solvent Recovery
• Aerosols	Loose-packed for Incineration

An attempt was made to dispose of any empty and dried paint containers in the solid waste drop box on-site. All cardboard that was brought to the site was recycled in a separate drop box that was supplied by a local recycler.

Vehicles began arriving at the site at 8:30 AM and processing began at approximately 9:10 AM. At the time processing began approximately

30 vehicles were on-site and waiting. By 10:00 AM the site was at capacity, with 50 vehicles on-site and processing time reaching almost one hour. Initially, vehicles were not told the waiting time which created instances where vehicles had to be let out of line to leave the site prior to their being processed. By 11:00 AM all vehicles were being told the wait time and further problems were avoided. The last vehicle was let on-site at 3:00 PM and was processed and off the site by 4:00 PM. It was estimated that approximately 100 vehicles either left the site prior to being processed or did not enter due to the processing wait time.

Summary of Processing Statistics:

Total Processing Hours	7.5 hrs - 9:00 AM to 4:30 PM
Total Vehicles Processed	500
Vehicles Turned Away	100
Processing Time/Vehicle	Aprox. 1 min/vehicle
Vehicles Processed/Hour	67

Waste packaging and site clean-up continued until 7:00 PM on Saturday and from 10:00 AM until Midnight on Sunday. Site clean-up was complete and all waste removed from the site within 36 hours after the close of the event.

COLLECTION AND EXCHANGE

Waste was collected and packaged in five categories: latex, oil based, solvents, penta and spray cans. The exchange was set up to accommodate only two categories: latex and oil based.

Following are the estimated quantities and costs for collection, disposal and exchange. Estimated quantities for paint and penta are based on 20 gallons of actual liquid per labpack; quantity for solvent is based on 55 gallons per drum, bulked.

Final Disposal

Material	**Quantity**	**Cost**
Latex Paint	139 Drums/2780 g	$48,650.00
Oil Based Paint	91 Drums/1820 g	$29,858.92
Spray Cans	4 Drums	$ 1,312.48
Solvents	3 Drums/165 g	$ 918.60
Pentachlorophenol	2 Drums/40 g	$ 1,750.00
Total Disposal	239 Drums/4805 est.	$82,490.00

Material Exchanged

Material	**Quantity**	**Percent**
Latex Paint	784 gallons	49%
Oil Based Paint	816 gallons	51%
Total Exchange	1600 gallons est.	

TOTAL COLLECTED **6405 gallons**

The exchange data was based on a survey form for all exchange participants. The above totals were estimated from the responses reported on the survey form. There were times when there were so many people in the exchange area that the workers could not get surveys from everyone, therefore, it is believed that the above numbers are conservative in that more paint was taken from the exchange which was not accounted for.

Other Costs

Equipment (tyvex, goggles,gloves etc.)	$1,200
Flyers (15,000)	$ 900
Advertising (3 ads in 12 papers)	$1,500
Signage (six reusable HHW Round-Up A-Board signs)	$ 300
Misc. (food etc.)	$ 300
Total	$4,200

SURVEY DATA

All vehicles which entered the site were given a survey form to fill out. The survey information will be used in planning for, and determining the success of future projects.

The data was compiled from the approximately 400 survey forms which were filled out and turned in at the event. Actual vehicle count was 500 based on an estimate of vehicles counted after the 400 survey forms ran out at 2:45 PM.

Participants City or Town:

Arlington	Bothell	Brier	**Edmonds**	**Everett**	Gold Bar	Granite Falls
2.4%	**3.2%**	**3.2%**	**22%**	**32%**	**.3%**	**1%**

Lake Stevens	Lynnwood	Marysville	Mill Creek	Monroe	MLT
1%	**10%**	**5%**	**2%**	**1.3%**	**6%**

Mukilteo	Snohomish	Stanwood	Startup	Woodinville	Seattle
2%	**5%**	**1.3%**	**.3%**	**2%**	**1%**

Participants Age:

Under 21	21-30	**31-50**	51-65	Over 65
.3%	**4.7%**	**42%**	**25%**	**28%**

Heard About Event:

N/paper	Flyer	Radio	TV	W/of Mouth	Billing	N/letter	Other
52%	**15%**	**3.5%**	**1.5%**	**3.5%**	**4.5%**	**9%**	**12%**

How Much Would Participant Be Willing To Pay For Service:

Nothing	**$5**	$10	$20
25%	**55%**	**16%**	**4%**

How Far Would Participant Travel To Attend An Event (in miles):

0-5	**6-10**	11-15	16-20	Over 20
11%	**40%**	**25%**	**14%**	**10%**

Is Participant Planning On Attending May 5, 1990 HHW Event:

Yes - 48% **No - 52%**

Willing To Have A Permanent Facility in Their Community:

Yes - 95% **No - 5%**

Total Households/Vehicle - 1.3

Total Vehicles - 500

Total Estimated Household Participation - 600 to 650

PUBLICITY AND PROMOTION

Publicity was coordinated by the County with assistance from a number of cities and towns. Approximately 15,000 flyers were printed and distributed to County mailing lists, by various cities and towns, in County offices, paint stores, County Libraries and solid waste transfer facilities. Press releases were sent to all Snohomish County and Seattle newspapers, community groups, two local radio stations, and Seattle radio and television stations. One month prior to the event a mailing to community groups was done and ads were taken out in 12 Snohomish County newspapers publicizing the availability of free paint. In the two weeks preceding the event, ads were placed in all local papers publicizing the event as a whole, both the acceptance and availability of used paint.

On the day of the event large A-board signs were placed at all nearby intersections and at the entrance of the site. The signs were bright yellow with black lettering and said "Paint Drop 'N Swap" with a large directional arrow.

EVALUATION

The Paint Drop 'n Swap project as a whole was a success and met or exceeding most planning estimates and goals. However, there are aspects to the project which could be improved upon. Following is a breakdown of the areas and recommendations which should improve the efficiency of any Paint Drop 'n Swap Project.

Publicity

Our promotion was extremely successful in bringing in paint for disposal, but we could have used more techniques to attract swappers. Some groups who had promised to take away large quantities of paint failed to show up or came with inadequate transportation for dealing with the volume we received. In future we would make direct phone calls to the community groups and construct a data base of those who can use large quantities of paint. We would also schedule specific appointment times for groups to pick up paint. Since this was a new program for this area, it could be that subsequent events would be better understood, thus resulting in larger numbers of swappers.

Site Operations/Staffing

The site should be set up to efficiently unload vehicles, screen out non-paint related items, sort and screen paint and deliver paint to the exchange area or the contractor. The four catagories which you should have staff for are: unloading, sorting, screening and delivery. For the size of the Snohomish County event 8 to 10 unloaders could have been used, two of which should be trained HHW chemists. Sorting should be done by 2 to 4 trained paint experts who can easily distinguish between oil base, latex and other types of paint. We had adequate screening capabilities with 2 people screening oil base and 3 screeing latex. The 4 people shuttling paint was also sufficient. However, to be more efficient an unloader should unload a vehicle into a cart take the cart to the sorting tables where a sorter would sort the paint to the appropriate screener. The unloader would pick up an empty cart an move to the next vehicle. There can be any number of variations to this but the key is to have plenty of staff and an operations plan and site setup on paper prior to the event.

Contractor Bid Specifications

It is very important to specify in the bid documents or the RFP exactly what you want the contractor to do. Be specific in the materials and/or types of items you expect the contractor to handle; the approximate number of staff you will expect the contractor to have on hand; when the contractor should be set up and ready to accept waste (this should be at least 1/2 hour prior to the advertised start of the event); and be specific as to how the contractor should package, recycle or dispose of the paint waste material. It is important to research the options available for disposal of paint waste. Contact your local TSDF and find the most feasible method i.e. fuels recovery, solidification for landfilling or labpack and landfill.

Exchange Area

The exchange area should be as big as you can possibly provide under a tent. We used a 20x20 tent and could have used more. The area should be lined with plastic and have an entrance and an exit. It is important to keep track of the people taking paint so that you have an accurate total for data collection purposes. Also, the availability of carts and at least 4 staff assistants would help. It is also helpful to sort the paint into at least oil base and latex, and if staff were available into dark and light colors. Latex paint could also be bulked into 5 gallon buckets to consolidate the most requested colors such as white, gray and beige. Also, if enough staff were available orders could be taken prior to the event for community groups and separated from the exchange area as it comes in. These groups could then pick up the already sorted and bulked paint without creating congestion in the exchange area which tends to get crowded.

Canada's Paint Program
Claudia Marsales

Household hazardous waste is, by definition, any material in the home that may, because of its chemical nature, endanger human health or contaminate the natural environment if not properly managed. These wastes can be liquids, solids or gases. When collected at a municipal depot, household hazardous waste is classified as a hazardous waste and subject to all applicable regulations. It is, therefore, packaged and transported with appropriate controls and procedures to a hazardous waste transfer station/processing facility. These requirements ensure that the handling of the materials is done by qualified, trained people with suitable safety and environmental protection precautions.

The collection of hazardous wastes from households in Canada has grown rapidly since 1984. In 1989, 80 of Ontario's 800 municipalities participated in the HHW program. For those communities sponsoring a program, 2-6% of their population participated. HHW programs include special one-day events as well as permanent collection depots. Although permanent depots provide a more convenient and cost-effective option, special waste days are expected to continue to be an important element of HHW collection programs across Canada.

Wastes collected through the HHW programs include motor oils, pesticides, acids and alkalies, batteries, pharmaceuticals, oxidizers, gas cylinders and surface coatings. Surface coatings, including paints, varnishes, shellacs, lacquers and stains consistently represent 70% of the volume of all the HHW collected. Oil and latex architectural paints represent 56% of all the waste received, and are 80% of all coatings. Waste latex paint represents 30% of the volume and waste oil paint 26% of all the volume of all of the HHW collected.

Motor oils, lead-acid batteries and propane cylinders are already successfully recycled but together represent only 16% of all HHW. Therefore, the largest opportunity for recycling of HHW materials involves the reuse/recycle of both latex and oil paints.

It is with this in mind that Laidlaw embarked on a pilot program to determine if waste paint could be successfully recycled.

Architectural coatings are complex chemical mixtures with a broad range of formulations based on the individual paint types, the changes in formulation components over the years by each producer and evolving paint technology. In addition to oil and latex paint, there is a wide variety of other architectural coatings including varnishes, urethanes, and polyurethanes. Laidlaw's paint recycling program deals exclusively with oil based and latex paints.

Many programs have attempted to recycle the paint collected. Unfortunately, these attempts have met with limited success. In fact, no large scale programs have been undertaken.

The general term "paint" describes a wide variety of complex chemical mixtures, some of which are chemically incompatible. Simple bulking of waste paints at HHW days will result in the production of a non-recycleable, jello-like, flammable sludge requiring disposal at a hazardous waste incineration facility or rotary kiln.

Further, old waste paint can contain potentially hazardous components which were originally added to the paint, including lead, mercury, and PCB's. Waste paint can also contain hazardous compounds added by the user and tramp material such as gloves and sticks. Municipalities, in attempting to recycle the collected paint by giving it away without chemical analysis, may have exposed themselves to potential liability.

The preparation of a safe recycled product must therefore, involve careful handling and sorting at the collection site, controlled mixing and processing, and extensive sampling and analysis in order to determine the levels of lead, PCB, and mercury are within acceptable limits.

The objectives of the program were:

1) To determine if latex and oil household waste paint could be separately blended under controlled conditions to yield good quality, reuseable paint products which met acceptable industry standards.

2) To evaluate the performance of a variety of equipment, process systems, procedures and methods required to maximize the quantity of waste paints which could be recycled, while maintaining product quality.

3) To refine the equipment and methods required on a full-scale production basis to produce consistent paint products.

4) To evaluate the recycled product in the field.

5) To establish the quality control mechanisms and to ensure that the recycled paints were safe for use.

6) To assess the need for additives or treatments required to stabilize and modify the characteristics of the paint products.

7) To review regulatory and liability issues.

8) Determine the marketability of the recycled paint product.

The Laidlaw project team, established in early 1989, included members of the Service, Operations and Laboratory groups. Every member of the team had extensive experience in the collection and handling of waste paints.

All of the waste paint received from HHW programs in containers of 1 litre capacity and larger were directed to the pilot recycling program. This allowed the development of methods and procedures for normal plant production and to ensure that the results could be directly implemented. In total, more than 200,000 litres of waste paint were blended and tested in this

program. During the first several months, the efforts focused on identifying and segregating waste paint to maximize production efficiency and to improve product quality. Samples of blended products were taken and analyzed and the blended paints were subsequently disposed of as a hazardous waste.

A collection system was already in place throughout Laidlaw's HHW program including the operation of permanent depots for Metro Toronto, Waterloo, Peel, and Halton.

The analytical program was also developed during this period, including environmental, health and safety and preliminary paint quality testing and analysis. The quality of the blended paints were compared to high quality standard and low quality standard commercial latex and oil paints in order to determine the future marketability of the product.

Composite samples were taken from the 205 litre drums of blended paints prepared from each week of production. Each of these "batch samples" represented a minimum of 1,000 litres of blended paint. Recycling of 80% of the total incoming waste oil and latex paints was achieved.

By the fall of 1989, consistent materials of reasonable quality were being generated at acceptable production rates and a more detailed evaluation program was initiated with the assistance of Canadian Industries Limited (CIL) and BAPCO Paints Inc. We undertook a comprehensive evaluation of the blended paints.

Laidlaw's Niagara Branch Laboratory performed the environmental

and health and safety testing on the blended paints and also performed a series of field application trials on metal, plastic, wood, and concrete surfaces inside and outdoors. Spreadability, coverage, and rheological properties of the blended paints were studied. Standard destructive testing was performed to evaluate durability, adhesion, surface hardness, and fade rate.

The hazard and safety control protocol consisted of testing for suspected hazardous compounds, including "PCB", mercury isocyanates, and lead.

The Q.C./Q.A. analysis involved the testing of the product paint to evaluate the specific coating characteristics.

Methods and procedures were developed to segregate and process the waste paint from HHW days and depots under controlled conditions. Production rates comparable to those achieved for direct disposal of the materials were attained while maintaining consistent blended paint quality. The efficiency of recovery of the waste oil and latex paints improved throughout the program to a level of 80% of the total volume received.

The detailed analysis of blended oil and latex paints for environmental and health and safety parameters confirmed that the products were safe for re-use.

Results of analyses for specific gravity, total volume solids, viscosity and ph indicated values comparable to low quality commercial paint for both latex and oil products, suitable for

use as primer. Then, in compliance with WHIMIS, Material Safety Data Sheets were prepared for Recycled Latex Paint, for Oil Paint - Lead Free and for Oil Paint - under 5% lead.
The field application trials were successful in every respect. The rheological properties of low - and high-shear viscosities indicated no significant differences in the performance of recycled coatings from that of the L.Q.S. and H.Q.S. On average, good coverage was achieved at a ratio of 50 ml. of latex paint per square metre. Multi-coat applications indicated that the paint had excellent hiding power and bleeding of the primer layers was not observed. The spreadability of the oil paint was determined to be approximately 33 ml. per square metre and multi-coat applications indicated good hiding power. There was good adhesion to cement block surfaces by both the oil and latex coatings. The end product was comparable to those obtained utilizing L.Q.S. product. The latex paint was also applied to untreated outside wooden stairs in high traffic areas. The product displayed excellent rheological properties.
Based on Laidlaw's experience across Canada at HHW days and depots, the average household currently has about 25 kg of hazardous waste in storage. Limited information is available on the average annual generation rates by households; however, based on the studies to date, it would appear to be in the order of 5 kg per year. These figures would be equivalent to an accumulation of about 40 million litres of latex and oil waste paints and an annual generation rate of 8 million litres of latex and oil paints in Ontario households alone. The average generation rate of waste paint, based on these figures, would represent about 20% of sales of paint in Ontario.

As new HHW programs are implemented, volumes per participant are high since they represent the waste accumulated over many years. As the collection service becomes regularized, the participation will increase but volumes per participant will eventually decrease. A rapid increase in the volumes of HHW collected is expected during the initial implementation stages of the programs across Canada. The growth in volume will thereafter increase moderately even though the services are expanding. It is estimated that the current volumes of waste latex and oil paints collected from HHW programs will continue to rapidly grow over the next 5 years to reach a relatively constant supply of about 2 million litres per year (or about 5% of available waste paint).

Based on the present program, about 80% of the collected oil and latex waste paints could be recycled. The total volume of recycled paint would, therefore, be up to 1.6 million litres per year, or 4% of total paint sold.

Laidlaw's pilot paint recycling program has demonstrated that the waste oil and latex paints can be efficiently processed with high yields of consistent products which would be safe for use. Testing and analysis procedures have been developed to provide the quality control and assurance essential to this operation.

It was determined that the recycled latex paint would have broad applications as an interior and exterior primer and for interior top-coating on institutional structures, industrial buildings, etc. Some tinting to a medium grey could be done. The oil paint could be used for large volume exterior applications such as barn, fence and building paint as well as interior and exterior applications on institutions, structures, and industrial buildings. The oil paint could, for example, be tinted red for some applications.

The capability to recycle waste latex and oil paint has dramatic implications for the HHW program in Canada. Assuming an 80% recapture on such paints, and assuming a 50% recapture potential for other coating types, coupled with the present recycling of oils, acids and cylinders, the total volume of potentially recycleable HHW is an astonishing 68%, resulting in disposal requirements for only 32% of the waste collected.

With the success of Laidlaw's paint recycling program, the next important issue to be resolved was how the paint product would be marketed.

With this in mind, we approached the Canadian Paint and Coatings Association to determine potential interest in processing and marketing the recycled paint.

I am happy to report that an agreement has been reached with the Canadian Paint and Coatings Association to begin production trials and marketing strategies and Laidlaw, through its HHW collection programs, is now working quickly to implement the system.

I hope you will agree that Laidlaw's pilot paint recycling project shows great promise.

ARNOLD H. HOFFMAN
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EPACONF NOV 6, 1990

PAINT RECYCLING: A CASE STUDY

The following is a case history of how Major Paint Company converted its wash water residue and plant call-backs into an economic asset and, as an additional benefit, cooperated with California municipalities and counties to recycle their collection program latex paints into a usable product.

Major Paint started a waste minimization and paint recycling program out of sheer economic necessity. The increase in the cost of disposing the wash water residue and paint sludge had become very sizable each year and a means had to be found to minimize or eliminate this non-profitable expense.

To review the background: In the mid 1970s, in order to comply with new Los Angeles County Sanitary District industrial waste water limits, Major installed a water treatment system to treat the 6000-7000 gallons per day of wash water generated by its latex paint manufacturing operation when cleaning the process tanks and piping. Prior to this time, the water was sent through a 6 compartment, 4000 gallon over-and-under clarifier. The clarified water went directly to the industrial sewer line and the settled solids were pumped out on a regular basis and disposed of in a commercial landfill.

This new treatment system consisted of two 5200 gallon agitated treatment tanks and assorted chemical feed pumps, piping and instrumentation. The chemical treatment clarified the supernate water to well under the Districts limits while generating approximately 1100 gallons of residue at 20-22% solids for each 5000 gallons treated. This residue was disposed of, by means of vacuum truck, as a liquid hazardous waste in a permitted landfill. The volume of sludge increased with the growth of the operation and the cost of hauling this dilute slurry became a major expense. Within a few years the daily wash water volume approached 10,000 gpd and a 7000 gallon tank was added to the system.

Since most of the cost of hauling was due to the volume of water, several dewatering methods, using filter presses and several types of centrifuges, were tested to reduce the volume of waste for disposal. We finally installed a precoat vaccuum filter from Alar Engineering, Chicago. This precoat system raised the solids level from the previous 20-22% to

60-65% by weight, and converted the residue to a solid rather than the liquid waste that was soon to be prohibited from hazardous waste landfills. This cake was disposed of in a permitted disposal site as a hazardous material, with considerable savings in hauling and disposal costs.

In the early 1980s as a result of our active participoation in technical and business associations, our contacts with state legislators and listening to the noises coming from the regulators in Sacramento, we decided that there was very little future for land filled hazardous wastes. We initiated a laboratory project to investigate the possibility of converting this latex paint based product into a usable product. We first looked at the filter cake as a starting point, as it had the lowest volume, but soon found that the cake was not ammenable to grinding and dispersion.

The final effort concentrated on the 22% sludge residue. By some creative and unique laboratory work, a formula was derived using 80% of the residue as the main constituent and adding selected resins and additives. This low cost product, suitable for coating concrete, masonry or rough wood, has excellent hide and exceptional adhesion, possibly due to the water treatment chemicals, and is beige in color as a result of the ferric chloride used in the water treatment. Any plant errors, call-backs, obsolete or unsalable material could be added to the mix during the treatment phase. By naming it "Maintainance Paint", and selling it at a price point very close to the production cost, a retail niche was found for this product. The payback is in the savings of disposal costs and fees and the declassification as a hazardous waste generator. Since 1984, no hazardous waste has left the Major Paint facility.

Concurrent with this work, an intensive wash water minimization program was initiated which cut the volume of wash water to about 30% of the high point.

Shortly after this recycled product appeared in our stores. Assemblywoman (now State Senator) Lucy Killea of San Diego approached several California paint companies for assistance in handling the paint returned during the "Round-up Days" she was starting as part of a Household Hazardous Waste program. Although no other company was interested, we agreed, providing that San Diego County would take back all the product received and recycled. The one restriction, after a disastrous first effort, was that the paints be screened and separated by the county or its contractor, and only latex paint, packaged in 55 gal drums, would be accepted for treatment.

Laboratory work indicated that up to 10% of latex paint from the collection programs could be incorporated into our treatment/recycling program with no noticeable effect upon the properties of our coating. The city or county receives 20% more paint than is sent in to cover the volume of the raw materials added to generate a usable coating. Since then, by word of mouth from county to county, the program has expanded to include many cities and counties from Northern to Southern California. These municipalities use the coating as a maintainance paint and to ovecoat graffiti. As this was a non-profit operation, done as a civic responsibility, no waste from industrial sources is accepted. I understand that there is now a small markup included in the cost to the counties and municipalities.

Continuing lab work is concentrating on finding better treatment chemicals which might allow a higher solids residue, better water clarity, faster precipitation and separation of the sludge, or allow the generation of more than the one color that we now produce. We have determined that for the municipal collection source recycling, more than 20% of returns can be incorporated with no discernible effect on the quality.

To sum up, it is possible, feasible and economically practical to convert latex wash water, plant errors and product returns into useful, salable products, and convert a regulatory nuisance into an advantage. Although, for quality assurance and raw material control, Major Paint Company prefers to go through the treatment system described above, some processors in Seattle and Northern California prefer to separate the latex paint by color, blend, mix and repackage without further additions. Either method will reduce the amount of paint going into the landfills and help improve the public perception of the paint industry.

Department of Health Services
ENVIRONMENTAL HEALTH SERVICES DIVISION

BOARD OF SUPERVISORS
ANNA G. ESHOO
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DIRECTOR OF HEALTH SERVICES
363-4305

SAN MATEO COUNTY PAINT PROGRAM

Rick Miller

San Mateo County HHW program contracts with SEM Products Inc. to recycle the latex paint.

At the Event:

The County's Environmental Health employees except the hazardous materials from the public. Specially trained employees segregate the materials into hazard classes, of which latex paint has a category itself. Once separated the latex paint is palletized and prepared for shipment. The paint is shipped to SEM Products, Inc. as a material.

After material arrives at SEM Product:

Specially trained paint technicians examine paint for signs of failure. The recyclable paint is then consolidated into 2 or 3 different batches according to color specifications. The paint is then mixed, filtered, tinted if desired and containerized.

Where does the paint go:

San Mateo County contributes all recycled paint to non-profit organizations, Cities in the County, the County and individuals. All paint is exterior latex and a MSDS is provided to all recipients.

A Demonstration:

The State of California has painted a bldg. at Cal Expo to test the paints characteristics. The paint has past all of the States requirements for use by the State except scrubbabilty (State reg. 800 scrubs recycled paint test 250 scrubs).

KING COUNTY'S HOUSEHOLD HAZARDOUS WASTEMOBILE

Henry Draper

Introduction

In the fall of 1989, the Solid Waste Division implemented the nation's first mobile household hazardous waste collection program. In a year of operation, that program has processed over 17,100 vehicles and collected over 1,065,000 pounds (532 tons), of household hazardous waste. Over sixty percent of this waste was recycled or beneficially reused. The Wastemobile program will continue at least through December 1991, making it the most successful ongoing collection program in the nation for this waste stream.

The Household Hazardous Wastemobile is an innovative, first of its kind program that provides for the collection, beneficial reuse, and disposal of Household Hazardous Waste (HHW), while simultaneously providing education on the hazards associated with HHW, information and workshops on alternatives.

The most innovative features of the program are its mobility and educational activities. The Wastemobile travels throughout King County making regularly scheduled stops in various communities. It collects HHW in one community for two weeks, then moves on to the next scheduled site. The schedule calls for it to visit 24 sites per year. The schedule is structured so that citizens in any part of the County can be assured that the Wastemobile will be back, either in that community or an adjacent one, within six months. The Wastemobile is truly mobile. It can be dismantled and moved within four hours after the collection event is completed.

The Wastemobile's target audience is households. All household hazardous wastes (paints, pesticides, automotive products, etc.) are accepted free of charge. Business wastes and explosives are not accepted. All wastes are handled and managed by staff from a local treatment, storage, and disposal firm, Chemical Processors, Inc., (Chempro). All hazardous materials collected are removed from the site at the end of each collection day and taken to the Chempro plant where most (approximately sixty percent) are beneficially reused or recycled. Some are detoxified, and the remainder are sent to a secure landfill or incinerated.

Educational materials are distributed at Wastemobile sites that inform citizens of the hazardous ingredients found in household hazardous wastes, their hazard properties, suggested alternatives, and proper waste management practices. The Wastemobile program also provides speakers for the targeted communities to conduct workshops on Sound Gardening practices and alternatives to common household chemicals.

Program History

The Solid Waste Division began collecting HHW in 1987 through Household Hazardous Waste Roundups, (King County's HHW collection events). Roundups were regional (four sites in separate areas of the County), one day, HHW collection events. Roundups were staffed largely by volunteers from the community and by governmental agencies impacted by the issue of improper disposal of HHW. Those agencies included the King County Solid Waste Division, the City of Seattle's Solid Waste Utility, the local sewer utility (METRO), the Washington State Department of Ecology, and the Seattle-King County Department of Public Health. The program was funded principally the governmental agencies. Local businesses also contributed funding and supplies to the program.

Roundups were very successful. In three years over 631 tons of household hazardous waste were collected and 14,168 vehicles processed. In fact, they were too successful! The overwhelming response of King County citizens to this service had them sometimes waiting in line for up to three hours. Staff that had volunteered for eight hours found themselves working into the night to process the tremendous backlog of waste and often returning the following day to finish cleaning up the collection site. Clearly something had to be done. A system had to be developed that did not depend so critically on volunteers and did not require citizens to sit in long lines to dispose of their household hazardous wastes.

The Wastemobile represents the solution to the challenge presented by the success of the Roundups. To meet that challenge, the solution had to provide a program that (1) was convenient for county residents, (2) occurred on a fixed, predictable schedule, and, (3) drew upon, and reenforced, the region's history of intergovernmental cooperation.

King County covers approximately 2,000 square miles. This vast area includes a highly urbanized center, which includes the city of Seattle, as well as suburban and rural areas. The SWD is responsible for solid waste management (which includes HHW) for the suburban cities and the unincorporated portion of this large area. In analyzing how to provide HHW services to county residents in a convenient, cost efficient manner it quickly became apparent that some type of mobile program would be necessary. The only problem was that there was no such program in existence.

Undaunted, the Solid Waste Division designed just such a program and invited responders to be innovative and suggest possible enhancements that would result in a stronger program.

The Wastemobile is the result of that process. A modified trailer and support unit are the hub of the operation. These vehicles contain an office and breakroom, an electric generator, compressor, and water system, a fire response system and a Haz Cat lab. A bathroom, emergency shower, and first aid station are also incorporated into the site plan. When set up for operation the site covers approximately 5,000 square feet with canopies over

the work areas and is surrounded by a portable fence which is secured each night.

The Wastemobile program is designed to move around the County. A key program goal is to make proper HHW disposal easy and convenient. That goal is achieved by making regularly scheduled stops in targeted communities, collecting HHW in that community for two weeks, then moving on to the next scheduled site.

For the remainder of 1990 and in 1991, the Wastemobile will continue its travels throughout King County. The schedule calls for it to visit twenty-four sites per year. The Wastemobile schedule is publicized on a yearly basis. The schedule is structured so that citizens in any part of the County can be assured that the Wastemobile will be back, either to that community or an adjacent one, within six months.

Siting has been one of the positive aspects of the Wastemobile program. In the year the Wastemobile has been in operation, it has visited twenty-four sites and encountered no community opposition. Wastemobile collection sites have included a church parking lot, a the local transit authority Park and Ride lots, Fire Department parking lots, supermarket parking lots, a county park parking lot, and a National Guard Armory parking lot. All that is required for a Wastemobile site is 5,000 square feet of paved area, available for two weeks.

Personnel and the Public

Collection of HHW at the Wastemobile is staffed entirely by employees of Chempro. Chempro is a firm licensed for the treatment, storage, and disposal of hazardous wastes. All Chempro staff working at the Wastemobile have received extensive training in the proper handling, testing, and manifesting of hazardous wastes.

Staffing levels for the Wastemobile are determined by the number of vehicles expected at a particular site, on a given day. On weekdays, Thursday and Friday, the Wastemobile is staffed by a minimum of three workers. Those workers are a Site Supervisor/Chemist and two Hazardous Waste Technicians. On Saturday, when a higher level of participation is expected, two more Hazardous Waste Technicians are added, bringing the total staffing to five.

Citizen participation at the Wastemobile determines the actual number of staff needed on a particular day. Actual staff at the Wastemobile have ranged as high as twenty-nine. This occurred on a record setting Saturday on which 480 vehicles were processed.

Metrocenter YMCA, which coordinated Household Hazardous Waste Round-Ups under contract to King County, is a subcontractor on the Wastemobile project. Metrocenter is responsible for site development, publicity, and educational programs.

Publicity includes news releases issued for each new location, the distribution of up to 10,000 flyers for each location through schools, utility billings, stores, and community centers, and the use of readerboards and other community bulletins to publicize the event. The basic strategy is to have channels that reach each household in the service area at least twice and preferably three times. Among the diverse mechanisms used have been distributing flyers at bingo games and community festivals, as well as piggybacking on utility and other mailings.

The core of the program is public involvement in properly managing and disposing of household hazardous wastes, and the program is attracting very large numbers of persons to carry out this task. In addition, the Wastemobile distributes educational materials to each person who comes to the facility, and incorporates a long-range education strategy. Metrocenter has designed two workshops, one on safe use and alternatives to hazardous materials developed with the Washington Toxics Coalition, and one on alternative methods of pest control developed with the Master Gardener Program of the Cooperative Extension Service. These workshops are currently being offered in the community, ideally in association with Wastemobile visits.

Publicity for the Wastemobile consists typically of flyers, posters, news releases, and utility bill inserts. As an example, for one recent site 3,000 flyers were distributed in the target community's elementary schools and 2,000 more were distributed through the city's department of public works, library system, and city offices. The area's three major newspapers and five community newspapers received news releases and two of the area's largest employers included information about the Wastemobile and its schedule in their employee newsletters. The local water and disposal utilities included the information and schedule in their bills to a total of 48,000 accounts.

Equipment, Systems, and Technology

The most unique feature of the Wastemobile is its mobility. The key pieces of equipment allowing for this mobility are the modified trailer and the support van. These two vehicles carry the equipment that comprise the Wastemobile, and allow King County to conduct HHW collection events anywhere 5,000 square feet of paved area are available for two weeks.

When set up, which can be accomplished in as little as four hours, a Wastemobile site is a fenced, 5,000 square foot area. Contained within the fenced area are: the Wastemobile trailer (which houses the Haz Cat lab, the office/mobile phone, and the breakroom), the support van, approximately 1,200 square feet of canopy covered workspace, a bathroom, an emergency shower, a first aid station, a fire response system, an electric generator, a compressor, fuel, gas and water systems, a lighting system, a portable ground cover, tables, portable berm trays, unloading, carts, and a forklift. (Please see appendix for equipment costs). Although the Wastemobile will use existing water and power systems when offered and available, it is designed to be fully self contained. A site is all that is required.

Once the Wastemobile site is setup it operates as would any other HHW collection. Citizens drive into the unloading area where they are greeted and their wastes screened. If the wastes are acceptable, they are unloaded for sorting, the citizen given information on HHW some and alternatives, asked to fill out a short questionnaire, thanked for their participation, and directed out of the unloading area. This entire process averages two to two and one half minutes per vehicle.

The collected materials are next moved to the sorting area where they are divided into one of four categories for processing. Those categories are latex paints, oil based paints, oils and solvents, an labpacks. Latex paint and motor oils are bulked on site. The remaining materials are labpacked.

The Solid Waste Division has reviewed with Chempro the reuse, recycling, and disposal options for each of the thirteen separate wastesteams collected by the Wastemobile. This review has resulted in approximately sixty percent of the materials collected by the Wastemobile being either beneficially reused or recycled.

HOUSEHOLD HAZARDOUS WASTE-ITS ROLE IN TODAY'S SOCIETY

Mike Shetler

Hazardous materials are synonymous with our modern western lifestyle. Many hazardous materials are designed for the public and are contained in various consumer products in the form of: household cleaning agents, paints, solvents, pesticides, batteries, and automotive fluids.

When hazardous household items become old or no longer have a value to the consumer, they are often discarded in the regular household trash. These items are eventually deposited in the local solid waste landfills which were only designed to store non-hazardous materials.

Household hazardous waste poses short term acute problems for sanitary landfill workers who must process the trash. It also contributes to long term chronic problems at all landfills which include: soil contamination, air pollutants, and groundwater contamination.

As part of the Solid Waste Management Plan for the County of Riverside estimates were made to determine the amount of household hazardous waste generated within the county's jurisdiction. It is estimated that household hazardous waste composes about 4% of the total hazardous waste generated in the County of Riverside. In 1988 the total amount of household hazardous waste exceeded 1286 tons. In the year 2000, maintaining a conservative 4% growth in household hazardous waste, this will amount to approximately 1932 tons.

Prior to February 1990 the County of Riverside did not have an organized Household Hazardous Waste Community Collection Program. This means that a significant amount of hazardous waste has entered the landfills and polluted the environment. It has been identified and documented by the Regional Water Quality Control Board that most landfills in Southern California have serious groundwater contamination problems.

How will a household hazardous waste collection program help to resolve the contamination problems at the sanitary landfills? First, by initiating a publicity campaign which explains the hazards of household hazardous waste the community becomes more aware of the problem. Second, by providing alternatives to disposal less household hazardous waste will get into the landfill. This is accomplished by providing a special location where the waste can be segregated into like components and then consolidated for recycling. This is the case for water based paints, used motor oil and anti-freeze and automotive batteries. The remainder of the household hazardous wastes are "lab packed" for incineration or disposal at special hazardous waste repositories that complies with stringent construction standards and environmental laws.

Why are household hazardous products a problem? In San Bernardino and Riverside Counties almost 80% of all drinking water comes from groundwater. In many areas of the Coachella and Palo Verde Valleys groundwater is at six feet below the surface. These liquefaction zones, in many cases, are highly contaminated with gasoline, kerosine, solvents and pesticides.

The collection of household hazardous wastes presents a different set of problems than those associated with the collection of industrial wastes. Household hazardous wastes are distributed over the whole population, in very small quantities, making the logistics of collection unmanageable for current commercially operating collection services.

A household hazardous waste community collection program must rely on the public's cooperation to separate hazardous materials from the normal trash and arrange to take them to a central collection facility. Unfortunately, the public is generally unaware of which common household products are toxic.

In the absence of commercial collection companies, numerous counties and local jurisdictions are beginning to provide the opportunity for citizens to properly dispose of their household hazardous wastes. It must be re-emphasized that to gain public cooperation the lead agency include an aggressive educational program and provide a disposal system that will be convenient for public use.

The County of Riverside Department of Health, Environmental Health Services Division, Hazardous Materials Branch has taken on the task of evaluating options that would provide the best possible service to the citizens of the County of Riverside. The alternatives included:

1. Several permanent sited facilities centrally located throughout the county operated simultaneously.
2. The establishment of one centralized facility to serve the entire county.
3. A mobile collection program which would be sited at various locations on a temporary basis throughout the county.
4. A combination of options 2 and 3.
5. Curb-side collection of household hazardous wastes.

The adoption of option 4 has many advantages because it brings the temporary collection center to an area that is convenient for public use. Further, it gives the County of Riverside a centralized point where the collected household hazardous wastes can be stored during profiling, consolidation, recycling, incineration or for final disposition at a residuals repository.

Currently, the County of Riverside is utilizing option three, the mobile household hazardous waste temporary site collection alternative. This alternative was chosen on the basis of funding, staffing, and siting constraints. Advantages of the mobile collection program include the flexibility to respond to varying community demand levels, cost of effectiveness, and the ability to assess public reaction to the program prior to commitment of substantial resources to a more permanent program.

The risks associated with the operation of a household hazardous waste community collection program are numerous, a few of the more significant risks are outlined below:

1. **Occupational Health:** The health of household hazardous waste collection workers is a major concern. One surprising result of every household collection program nation-wide is the amount of highly toxic and extremely hazardous waste, (as defined by the Code of Federal Regulations, Title 40, Section 261.5 (e)), brought into the collection sites. The acceptance of these highly toxic wastes increases the potential of exposure to household hazardous waste worker.

2. **Site Selection Criteria:** As part of the process of siting a permanent or temporary household hazardous waste collection program in California specific criteria as documented in the Hazardous Waste Management Plan, (Assembly Bill 2948), must be adhered too. This process includes meeting criteria of the California Environmental Quality Act (CEQA). Some of the concerns that must be addressed include storage of flammables, poisons, corrosives, and oxidizers; and accidental spills by participants of the program while enroute to or at the collection facility.

A household hazardous waste collection project initiated by the Ramsey County Public Health Department, St. Paul, Minnesota, developed a relative risk ranking for various household hazardous waste collection options. Although, the door to door collection concept would appear to be most convenient, the occupational risk to hazardous waste worker is substantial (See Table 8).

Table 8
Relative Ranking of Options
(Participation Rate of 1 to 5 % of Households)

Options	Public Health	Occupational Health	Environ-mental	Property
Temporary Collection	A	B	A	A
Permanent Collection	B	C	A	A
Door-to-Door	A	D	A	B

Ranking: "A" poses least risk, "D" poses greatest risk

Source: Sarnet, C.L., " County Develops a Permanent Hazardous Waste Collection Program", Public Works, Jan 1990, Vol. 121, No. 1, p. 59.

What Constitutes Household Hazardous Waste?

"Hazardous waste" (as defined in the California Health and Safety Code) means any waste, or combination of wastes, which because of it quantity, concentration, or physical, chemical, or infectious characteristics may either:

(a) cause or contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness.

(b) Pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Household products that typically are considered hazardous are drain cleaners, finger-nail polish removers, household cleaning agents, pesticides, herbicides, arts and crafts supplies, automotive fluids, and building supplies. (See Table 9 for listing hazardous chemicals and potential alternatives to disposal)

Source:
County of Riverside Department of Health, Environmental Health Services, Information Fact Sheet, Jan. 1990.

Ten Safety Tips for Consumers of Household Hazardous Chemicals

1. Keep all toxic and poisonous chemicals out of the reach of pets and children.
2. Always keep these materials in their original container and with their original label.
3. Never put chemicals in jars, bottles or containers which might cause them to be mistaken for food.
4. Never mix materials unless the directions specifically say that you may do so.
5. Always store hazardous materials in a cool dry place (NEVER NEAR AN OPEN FLAME).
6. If the container is leaking or deteriorated in any manner, put the container into a large plastic pail and surround the leaking container with sand or kitty litter.
7. Keep all lids to containers tightly sealed.
8. Always follow listed instructions and recommended strength.
9. Only buy what you intend to use right away.
10. Try to use less toxic or non-toxic replacements.

Program Goal

The program goal is to provide the citizens of the County of Riverside a full service Household Hazardous Waste Community Collection Program which will recycle all materials that are amenable to recycling and find cost effective and environmentally sounds methods of disposal for those materials that can not be recycled.

Program Objectives

The program objectives have been modified significantly from the envisioned program concept. The revised objectives are listed below:

1. Hire staff and support personnel to provide adequate coverage of the collection center. Staff should include one (1) clerk/typist, two (2) hazardous materials management specialists, and four (4) laborers or lab packing technicians.
2. Select and schedule collection sites. Submit the necessary applications to the Department of Health Services.
3. Train staff in accordance with OSHA 29 CFR 1910 and Department of Health Services requirements.
4. Obtain the necessary equipment and supplies to support the Household Hazardous Waste Community Collection Program.
5. Apply for the necessary variances and permits from the Department of Health Services.
6. Contract with a private hazardous waste hauling and disposal company to properly manifest, transport, and dispose of household hazardous waste.

7. Initiate publicity campaign to advertise program.
8. Develop educational information to be used at presentations and at collection sites that will promote recycling and provide a forum for critical thinking about the environment.

Program Activities

The program activities that are actively planned include:

1. scheduling of personnel to work at each temporary site throughout the County of Riverside.
that no hazardous waste is entering the non-hazardous
2. Collect household wastes by segregating like materials into Department of Transportation Hazard Classifications.
3. Consolidate those materials that can be recycled: waste oil, anti-freeze, waste paint, and automotive batteries.
4. Lab pack all household hazardous wastes that can not be recycled or reused.
5. properly label and manifest all lab packs for transportation and disposal.
6. Sample and categorize all unknowns using field chemical identification procedure (HAZCAT)
7. Maintain accurate records on all materials collected including type, amount, and its ultimate disposition.
8. Make routine inspections of solid waste generated from consolidation of waste oil, antifreeze, and paint to ensure waste landfill.
9. provide community training on household hazardous waste and environmental topics.
10. provide information and consultation to the public and civic organizations regarding the safe disposal and handling of discarded household hazardous materials.

Program Evaluation

There are several tools that can be used to provide feedback on the usefulness of the Household Hazardous Waste Community Collection Program:

1. Evaluate feedback from survey forms provided to each citizen who utilizes the collection center.
2. Evaluate feedback from media (newspaper, radio, and television.)
3. Request and evaluate feedback from the Hazardous Materials Citizens Advisory Committee.
4. After sufficient time compare with other counties program effectiveness in terms of hazardous waste diverted, participation, and quantities and types of household hazardous wastes collected.
5. Evaluate feedback from landfill personnel to determine effectiveness.

6. Reevaluate program plan based upon results.

Fees/Funding Mechanism

Currently there are no direct fees collected for this program. The County of Riverside Board of Supervisors became aware of the household hazardous waste issue in 1987 and approved a funding mechanism to initiate the household hazardous waste program. The source of funding was a 10 cent per ton surcharge, "tipping fee", imposed on all haulers of non-hazardous solid waste utilizing the county landfills. The fee was increased to 25 cents per ton in July of 1988 and generated in excess of $380,000.00 in fiscal year 88/89. It is estimated that a fully operational program of the size suggested for the County of Riverside including equipment, personnel, storage, transportation, and disposal will exceed $1.2 million per year.

Alternative funding to make up the difference could include grants from California's Integrated Solid Waste Management Board (Assembly Bill 939), Department of Health Services Alternative Technology Grant Program, Private Foundation Funding, tax increases, and/or direct charge to the consumer. The County of Santa Clara currently allows small quantity generators (small industry and businesses) to participate in the household hazardous waste collection program by charging a nominal $10 per gallon fee for disposal.

Program Design

The concept of a mobile household hazardous waste collection program was devised, due in part to monetary constraints and personnel shortages. The creators felt that by providing service similar to what the military refers to as a M.A.S.H. (Mobile Army Surgical Hospital) citizens throughout the community can be afforded the opportunity to dispose of their household hazardous wastes.

When this concept was brought before the Department of Health Services there was much skepticism and concern. No one at the state level had envisioned this variation of the household hazardous waste collection program. They believed that major problems would surface which would include training of staff, siteing of temporary facilities, abandonment of hazardous waste, and confusion of the public. After 18 months of regulatory bantering and red-tape the final go ahead for a one year variance was granted to operate the mobile household hazardous waste community collection program.

An initial outlay of funds was spent for capital equipment which included:

1. the construction of a special designed storage container which provides secondary containment for accidental spills, explosion proof panel, safety eye wash and shower, placarding, and transportability to temporary sites.
2. the purchase of a pickup truck with a lift-gate to

assist in the movement of drums around the site.
3. retrofitting of a van conversion for safety equipment, library, chemical analysis equipment, supplies, and communications (radio and cellular phone).
4. an open purchase order for $20,000 to replace safety items such as gloves, goggles, protective clothing, and respirators.
5. establishing a service contract with a hazardous waste disposal contractor to provide transportation, storage, disposal, and technical expertise.
6. provide a pleasant working environment. This is difficult because the program is basically done outdoors. However, measures have been taken to provide shade over the working area, equipment to make the job less labor intensive, and adequate breaks to rest personnel.

Program Execution

Each site will be operated with a minimum of one (1) supervising hazardous materials management specialist and five (5) hazardous materials specialists who have been trained in accordance with current safety standards. The household hazardous waste community collection program will operate and accept household hazardous waste a maximum of four (4) hours per day, three (3) days per week. There will be one Saturday collection day where the collection center will be open for a maximum of six (6) hours.

As waste is received from the community each participant will be required to provide the following information:

1. Name
2. Address
3. Telephone Number
4. California Drivers License #
5. Type and amount of hazardous waste being discarded

This information is provided to insure that the waste is being generated from a household and that the participant is a resident of Riverside County. Also, if questions arise as to the contents of an unknown the individual can be contacted to answer questions that might help in the identification process.

After a household hazardous material is accepted it is categorized into a Department of Transportation (DOT) hazard class such as: flammable, corrosive, poison, and/or oxidizer. If a materials lacks labeling information than the materials is categorized based on field chemical analysis procedures outlined in the Hazardous Materials Categorization Field Manual developed by Mr. Robert Turkington.

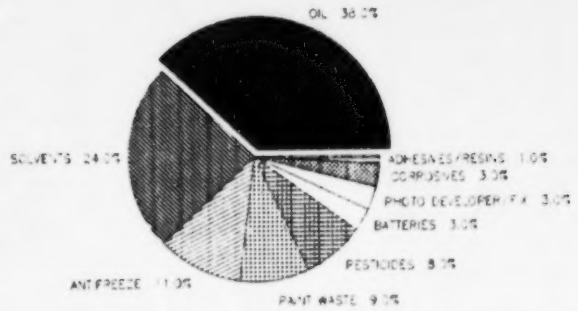
Materials that can be recycled such as waste oil, paint, anti-freeze, and automotive batteries are consolidated to save money in shipping costs. Pesticides, flammable and combustible liquids, oxidizers are segregated and lab packed into fifty-five gallon steel drums for disposal at a residuals repository that is certified by the Department of Health Services as meeting the requirement as a treatment, storage, and disposal (TSD) facility.

RIVERSIDE COUNTY'S
HOUSEHOLD HAZARDOUS WASTE PROGRAM

- WASTE OIL
- WASTE ANTI-FREEZE
- AUTOMOTIVE BATTERIES
- WASTE PAINT
- OLD OR UNUSED PESTICIDES
- SOLVENTS AND CLEANERS
- CORROSIVES (ACIDS & CAUSTICS)
- PHOTO PROCESSING WASTES

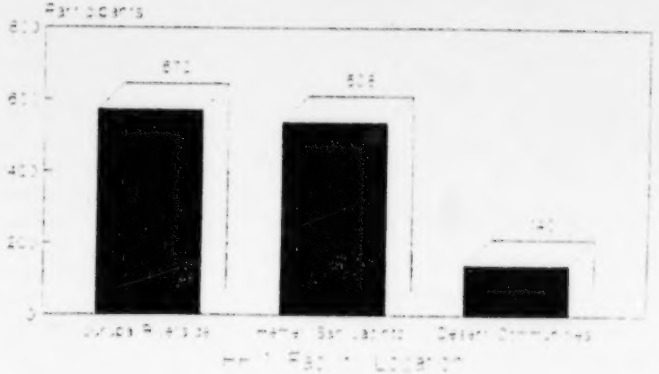
TYPICAL HOUSEHOLD HA[illegible]DOUS WASTE

HOUSEHOLD HAZARDOUS WASTE
WASTE TYPES GENERATED



PERCENT DISPOSED PER YEAR

County of Riverside
HHW Collection Information



Number of Participants

408

WHAT HAPPENS WHEN YOU ARE CARELESS ABOUT DISPOSING OF HAZARDOUS MATERIALS?

PUTTING toxic materials into the trash can injure sanitation workers along with contaminating our landfills and surrounding areas in our community.

POURING toxic materials down the drain can disrupt the sewer system or the biological process on which a septic system relies on to operate correctly.

DUMPING toxic materials on the ground will contaminate the soil where children play and may cause contamination of the ground water we drink.

EMPTYING toxic materials into the street can work its way into storm drains and can go directly into our waterways which everyone uses.

WHERE TO DISPOSE OF HOUSEHOLD HAZARDOUS WASTES

Household Hazardous Waste can be disposed of, at no direct cost to the consumer, at a special *Mobile Household Hazardous Waste Collection Center*. This collection center will be located on an interim basis at five regional sites throughout the county in conjuction with the county-wide "Trash Busters" activities sponsored by the Riverside County Board of Supervisors. You can identify the Household Hazardous Waste Collection Center by the HAZ-MAN and Household Hazardous Waste Collection Logos. For the time and location of the *Mobile Household Hazardous Waste Collection Center* in your area contact the County of Riverside, Department of Health, Environmental Health Services, Hazardous Materials Management Branch at (714) 358-5055.

Household Hazardous Waste Community Collection Center

Keep Informed / Get Involved

* LEARN more about toxic chemicals in your home, workplace, and community. Libraries, and the news media provide current information about toxic chemicals.
* SUPPORT legislation that protects the workplace and the environment.
* GET INVOLVED in the community decision-making processes. You can help to minimize the use of toxic chemicals in your community by speaking up!
* ASK QUESTIONS about toxic chemicals and waste you have a RIGHT-TO-KNOW about hazards in the Community.

To help preserve the environment this pamphlet printed on recycled paper.

County of Riverside, Department of Health
Environmental Health Services
Hazardous Materials Management Branch

HAZMAN SAYS---

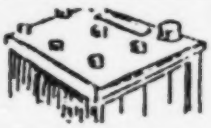
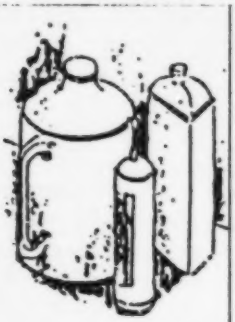
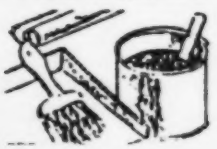
YOU PROBABLY HAVE TOXIC PRODUCTS IN YOUR HOME

Many of the products we use around our homes are toxic and can be harmful to our health and the environment. Some of these items include: household cleaners, motor oil, solvents, pesticides, paints and pool supplies. Not only are these products harmful when being use, they also become hazardous wastes when disposed.

HOW YOU CAN HELP CONTROL HAZARDOUS PRODUCTS IN YOUR HOME

* Purchase only what you will need
* Use up the product completely
* Reseal the unused portion after use
* Recycle whatever you can

Many of the cleaners, pesticides, and sprays we use daily are hazardous to you and your families health. When these items are thrown away or rinsed down the drain, your are unavoidably contributing to the toxic pollution entering our environment. Listed below are some of the safe alternatives to using toxic chemicals.

	PRODUCT	HAZARD	ALTERNATIVE
PESTICIDES, HERBICIDES & FUNGICIDES			
	FLEA POWDERS, ANT & ROACH KILLERS, GARDEN INSECTICIDES & WEED KILLERS	POISON, SOME FLAMMABLE	For information on organic gardening techniques or the control of garden pests with the minimal use of chemicals, call the County Agricultural Commissioner, Pesticide Division.
AUTOMOTIVE PRODUCTS			
	Waste Oil	FLAMMABLE	Recycle
	Brake & Transmission Fluids	FLAMMABLE	Recycle with waste oil
	Car Batteries	CORROSIVE	Recycle
HOUSEHOLD CLEANERS			
	OVEN CLEANERS	CORROSIVE	Keep your oven clean as you use it.
	TOILET BOWL CLEANERS	CORROSIVE IRRITANT	A general household cleaner or baking soda can be used. Clean toilets often.
	GLASS CLEANER	CORROSIVE	Use warm water & vinegar 8-1 solution
	CHLORINE BLEACH	FLAMMABLE	None
	RUG & UPHOLSTERY CLEANERS	CORROSIVE IRRITANT	Non aerosol rug shampoos should be used. Always wear gloves & keep area well ventilated
	AIR FRESHNERS	FLAMMABLE	Open windows & air out home often
PAINT PRODUCTS			
	OIL BASE PAINTS & ENAMELS	FLAMMABLE TOXIC	Use water base paints, which also do not require thinners or solvents
	SOLVENTS & THINNERS	FLAMMABLE	None, except in painting use water base paints
MISCELLANEOUS PRODUCTS			
	POOL SUPPLIES	CORROSIVE	None
	AEROSOL HAIRSPRAYS	FLAMMABLE	Use non aerosol, hand pump hair sprays
	ART SUPPLIES	POISON	Use non toxic water base products

KEY TO HAZARDS

POISON - ACUTELY TOXIC POISONS CAN CAUSE SEVERE ILLNESS OR DEATH IF INGESTED. MANY CAN BE ABSORBED DIRECTLY THROUGH THE SKIN OR RESPIRATORY SYSTEM.

FLAMMABLE - MANY FLAMMABLE PRODUCTS CONTAIN PETROLEUM DISTILLATE OR OTHER SOLVENTS WHICH ARE SKIN, EYE AND RESPIRATORY IRRITANTS. CAN BE FATAL IF INGESTED. MANY ARE VOLATILE, EMIT TOXIC VAPORS AND SHOULD ONLY BE USED WITH ADEQUATE VENTILATION. THESE PRODUCTS SHOULD NEVER BE STORED NEAR AN IGNITION SOURCE OR WITH CORROSIVE PRODUCTS.

CORROSIVE - ANY EXTREMELY ACID OR ALKALINE PRODUCT IS CORROSIVE. THEY CAN CAUSE SEVERE BURNS ON CONTACT, VAPORS CAN BURN EYES AND MUCOUS MEMBRANES AND THEY ARE VERY POISONOUS IF INGESTED. IRRITANTS ARE MILDLY CORROSIVE OR VOLATILE SUBSTANCES WHICH CAN IRRITATE SKIN, EYES AND MUCOUS MEMBRANES.

IRRITANTS - IRRITANTS ARE MILDLY CORROSIVE OR VOLATILE SUBSTANCES WHICH CAN IRRITATE SKIN, EYES AND MUCOUS MEMBRANES.

PRESENTATION BY FRANK B. ENSELL
SOLID WASTE MANAGER, KLICKITAT COUNTY, WASHINGTON
MOBILE COLLECTIONS
HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE
SAN FRANCISCO, CALIFORNIA
NOVEMBER 1990

Good Afternoon! I would like to review the manner in which Klickitat County, Washington, conducted its mobile collection. I also have some slides I will show at the end of my presentation.

In the state of Washington, all counties are required to periodically plan for a local hazardous waste management program similar to what is required in California. One difference is that we have a separate plan for household hazardous waste and the small quantity generators. The details of this planning process will be discussed tomorrow by Bill Green from the Washington Department of Ecology so I am not going to go into it now.

In 1987, the County hired I. W. Beck and Associates to assist us in the preparation of our local hazardous waste plan. Our hazardous waste plan was the second one created of all the rural counties in Washington state. We tried to be open to new possibilities for creating collection mechanisms that would be workable in our rural community. I had been with Island County for three years before and we had four collections in one-day locations. I was able to utilize that experience to develop what was called our "tailgate" operation. This was a team effort of the County, Washington State University Cooperative Extension Agents, the Department of Ecology, Rabanco Regional Landfill and Northwest EnviroService, Inc., who is our disposal company.

You may be wondering where Goldendale, Washington is. Seattle is a "sleeping" community of Goldendale which is about 200 miles southeast. Klickitat County has a population of 16,700, 63% of which is unincorporated. Our population averages 9 persons per square mile. We have farms that are called "Century" farms because people or their families have owned them for a century or more. Except for San Juan County, we had the highest cost per capita ($1.76) and drums per 1,000 population which was 2.75 drums. The cost per drum was $636 for a total cost of over $29,000.

One hundred thirty-seven vehicles participated in the tailgate collection. The participation rate was 2% of the 7,700 households in the area. Most other areas had a participation rate of 1% or less. The second collection operation was just completed in October. Two collection operations have been held since the program was instituted; one in May and one in October. Forty-six drums were collected in May compared to 52 in October. In addition, 110 gallons of oil were collected in May compared to 235 gallons in October. In May, 37 automobile batteries were collected compared to 215 batteries in October. One gentleman brought in 16 batteries and then chased us down the road with 67 more when he found out we didn't care how many he brought.

Two communities increased their participation in October over what they did in May. One of the best was Dallesport, who had a 300% increase in the participation rate. In May they had 2 and in October they had 6.

To prepare for the collection days, we went throughout the County and displayed posters everywhere we could. Some of the posters are available if anyone would like to have one. Attractive flyers were distributed at all the schools to the students. These flyers were not as helpful as we had hoped. I was disappointed in the school participation. Copies of flyers are also available to be handed out. Finally, advertising was placed on Reader Boards. The County only has a couple of these, one of which is in Goldendale. This type of advertising gets out to the people. Advertising needs to be put out in advance; however, the time element is important as you can put it out too far in advance.

At this time, I would like to show you some slides taken during the preparation and conduction of the tailgate collection. (At this point, slides were presented showing the various phases of the collection process. These included maps of routes used, terrain of the County showing roads, bridges, etc., signs used to promote the event, Roosevelt and Rabanco landfills, vehicles used which included vans, Northwest EnviroService, Inc. trucks, pictures of the portable office, pictures of participants arriving, filling out forms, traffic flow and unloading of materials and staff who helped with the event.)

The county of Klickitat is approximately 2,000 square miles. Goldendale is in the center of the County. A lot of the roads have switchbacks on them and are up and down. It is mountainous country. This is a rural community. Even our largest city, Goldendale, is rural. It was necessary to travel this area to select the various sites. Locations were selected on population. Some of these communities are pretty remote. In some areas it was difficult to find an area to set up the collection center. I went over the route with a stop watch and clocked the miles and time it took to each collection point. It took an hour to an hour and a half driving time to each site. Collection sites were set up at all the schools since in most of the places, the only place we had to use was the schools. In May, two collection sites were used the first day, three the second day and two the third day. The final one was in Goldendale for everybody that missed the other collection days. The October collection was cut down to three days.

It was necessary to check the calendar for holidays, special events and hunting season - they are avid hunters in this area. I made the mistake of setting up in Goldendale on Mother's Day. Very few people participated. There were sixteen participating in May and 56 in October because it was not Mother's Day.

Various vehicles were used to help with the collection. Vans were used, Northwest EnviroService, Inc. trucks were there to collect the materials, a county truck was used for latex paint, motor oil and rubbish people may have brought - we took it all. In

Dallesport another county truck had to be called for because so much oil was received.

A portable office was set up at each site. Barrels were set up to keep people from the work area. Signs and cones were set up to alert traffic. One area was pretty heavily traveled - five cars went by while we were there. Forms were given to the people by the secretary. However, names were not required on these forms giving the individuals anonymity.

The forms that were filled out and returned showed that most participants were households. No one checked farming and ranching or commercial and business. The average age was 35 to 50. No one 21 or under participated. Participation was high among older people who save everything. They feel it is all good stuff and never throw it away. Other questions asked on the form were: how far would you be willing to drive, would you be willing to pay money, and where did you hear about the collection. This part bothered me the most. A program was held in a couple of schools where teachers were asked to present a talk, but there were only 14 people that said they heard about the collection from school children. Surprising, was the number who checked they heard from newspapers since the County only has a weekly newspaper. Word of mouth was 25. All of the items checked on this one had more selecting it than "learning about the collections from the school children." I feel I did not do my job of education well. We are trying to correct this by talking to the principals and superintendents to develop an aggressive program in the schools. Most people checked they want more collections than annually or semi-annually. Not too many reported they had attended the previous collection. These statistics were from the May collection. Finally, a list of products turned in were noted. Some of the items were listed as being 40 years old or more.

I have had some unusual items turned in. When I was in Island County a grenade was turned in. In this collection, two containers of Agent Orange were received. Batteries were collected, fluorescent lights, oil, paint and other things.

To save on costs, the latex paints were solidified by us. In addition, we took the oil base paints and bulked it out ourselves which also cut down some of the costs. We took care of the oil and batteries. We sell the batteries; depending upon who purchases them, we can get from $.50 to $1.00 on the batteries.

Copies of the questionnaire that was filled out by the participants with a list of the steps that were followed printed on the back are available for anyone desiring them.

Thank you.

At this point a question and answer session was held.

HEALTH AND SAFETY

Larry Sweetser, Environmental Compliance Program Manager, Norcal Solid Waste Systems, Inc., San Francisco, CA.

Successful HHW projects depend upon preparation for the unexpected. By learning from the experience of others, communities can have contingency plans in place. He warns, however, that it is impossible to plan for all problems, especially because of the intense nature of a collection day.

PREPLANNING

Sponsors should consider the following preplanning guidelines:

A. General Considerations

- o Identify the entity accepting status as hazardous waste generator.
- o Identify the project coordinator.
- o Assemble a project team (sponsors, management, hauler) to develop the project.
- o Contact the disposal site to ensure ability to accept all collected wastes.
- o Determine if any recycling is going to occur: this can greatly affect the flow of waste and safety issues at the site.

B. Permitting Considerations

- o Obtain approvals from all relevant state and local agencies.
- o Adhere to an operation plan.
- o Design flexibility into the plan to adjust to situations that arise during the collection day.

C. Public Education/Notification Considerations

- o Stress safe packaging and recommended transport.
- o Indicate wastes accepted and excluded from the project.
- o Provide instructions for participants prior to arrival at the site.

o Provide a telephone number for additional information.

D. Site Location Considerations

o Accessibility/familiarity to target area participants

o Access from main roads

o Non-obstruction with existing traffic flows

o Considerations for traffic at the site
  -- excess traffic handling
  -- worker parking
  -- entrance area and egress
  -- waste receiving lanes

o Available resources
  -- impervious surface
  -- storm drains, wells, streams
  -- communications: telephone, radio
  -- sanitary/decontamination facilities
  -- shelter from inclement weather
  -- power supplies
  -- lighting

o Insurance

E. Site Personnel Considerations

Many people will be needed. Specific jobs must be assigned.

o Volunteer vs. hired staff

o Identification of personnel in authority

o Numbers of workers

o Qualifications

o Responsibilities

o Training

o Information packet

F. Equipment Considerations

o Checklist of equipment (from drums to pencils)

- o Contingency plan for getting forgotten or additional supplies, especially since many projects are on weekends
- o Identify sources
- o Arrange for arrival at the site

G. Waste Handling Considerations

- o Flow of waste on the site
- o Excluded waste contingencies
- o Non-resident participation
- o Acceptance of waste from businesses or non-profit groups
- o Disposal of non-hazardous waste
- o Establish recycling procedure, if applicable

H. Emergency Response Procedures

- o Pre-notification of local agencies
- o Established procedures
- o Designation of on-scene coordinator
- o Training of site personnel
- o On-site assistance vs. on call: health department, haz-mat vehicle, police, fire, bomb squad

I. General Health and Safety Issues

- o Personal protection
  - -- availability
  - -- required items such as protective glasses
  - -- enforcement
- o Relief area: for breaks, lunch

J. Post Project

- o Site cleanup
- o Excess material removal
- o Extended waste storage contingency

- Project review with coordinators

THE COLLECTION DAY

Sponsors should consider the following items for on-site waste handling operations during the collection day:

A. General Set-up

- Arrival of personnel
- Final instructions to personnel
- Restricted areas
- Media area
- Traffic flow -- provide directions to the site and on-site controls such as signs and cones.
- Opening time -- be prepared for early arrivals. Do not begin the event with a back-up of cars.

B. Entrance Area

- Well identified with markers such as signs and balloons
- Personnel -- police officer or other designated person should be present to control traffic as it enters the site.
- Waste pre-screening
- Distribution of literature/questionnaires/surveys
- Participant verification -- make sure only resident households and other targeted participants are admitted.

C. Receiving Area

- Traffic flow
- Personnel
  --responsibilities
  --qualifications

D. Sorting Area

- Identification of waste into hazard classification -- be sure to ask homeowners for information before they leave the site.

- o Personnel
  - --authority
  - --responsibilities
  - --qualifications

E. Packaging Area

- o Verification of waste classification
- o Personnel
- o Liability

F. Waste Loading Area

- o Non-interference with traffic
- o Close to packaging area

G. Vehicle Exit

- o Coordinators
- o Traffic Flow

H. Special Waste Area

- o Haz-cat: identification of unknowns
- o Paint consolidation
- o Waste oil
- o Designated site for especially dangerous waste such as dioxin, explosives, pentachlorophenol

I. Equipment Storage

- o Accessible
- o Non-obstructive

POST PROJECT

A. Finalization of recordkeeping

- o Manifest
- o Variances

B. Critique

- o by personnel
- o by sponsors

C. Identification of preventative measures

D. Determination of future plans

E. Notes of appreciation sent to

- o all personnel
- o all involved organizations

STAFFING AND TRAINING NEEDS AT PERMANENT AND ONE DAY HOUSEHOLD HAZARDOUS WASTE COLLECTION EVENTS

LEEANN MERASHOFF, FIELD SERVICE MANAGER

One of the most important aspects of managing a HHW center - staffing and training - is often left to the end or left out of planning altogether. HHW is not like newspapers or glass that can be dropped off. To be managed safely and efficiently skilled, trained personnel are required.

Staff Requirements

Management:
It is important that one key individual be designated who will be knowledgeable in hazardous waste regulations and in particular the specific permit of the program or center. This individual will interface with both regulatory officials, city or county officials and disposal or waste management firms.

You need someone at the helm!

Management personnel will oversee activities, especially regulatory issues, waste disposal, inspections, etc., monitors financials.

Chemists:
A chemist experienced in household hazardous waste is essential to the safe operation of any program or center. The chemist will inspect, accept, or reject wastes brought to the program. The chemist will test and identify unknowns, supervise or actually do labpackaging of wastes, and supervise waste consolidation.

Technicians:
Technicians that are properly trained can perform many functions in HHW collection programs. Their duties include unloading vehicles, pouring off liquid wastes and consolidating paints under the supervision of the chemist. They can set up and take down the site, move supplies, and may also do inspections or maintenance duties.

In summary, the minimum number of staff and the types of staff required to operate a collection center with a storage capacity of approximately 40 drums is as follows:

management - one
HHW-experienced chemist - one to two
technicians - 5 active at center when open

The technicians, and possibly the chemists, can be utilized on a rotating basis out of a pool of trained individuals.

Laidlaw Environmental Services (North East), Inc.
221 Sutton Street North Andover, Massachusetts 01845 Phone 508.683.1002 Fax 508.794.9665

TRAINING REQUIREMENTS

There are two cases which may exist regarding training of individuals working at a HHW program or center:

1. Subject to OSHA 1910.120 training requirements
2. Not subject to OSHA 1910.120 training requirements

The first case will apply if the wastes being managed are considered by the regulatory agency involved or the permit to be hazardous wastes.

The second case will apply if the wastes are considered to be solid wastes, not hazardous wastes.

Of course, specific permits may require certain types of training regardless of the waste status.

The following is a summary of the types of training needed to comply with OSHA 1910.120. It is recommended that similar training be given even if OSHA compliance is not applicable.

OSHA 1910.120 specifies several levels of training, with increasing hours of training, for personnel working at hazardous waste sites or facilities. The lowest level applicable training level for HHW programs is the First Responder Operations level, which requires eight hours of training. A sample outline is attached. This level is appropriate for technicians at a permanent center, or for temporary workers at a HHW program. These workers can participate in all activities involving waste handling, but would have to evacuate should an emergency situation arise.

The HHW chemists should have the greatest amount of training. Typically they will be trained to the Site Emergency Responder level, and have 40 or more hours of training. An outline is attached. The chemist is trained to work with a spill response team should a serious spill arise, as well as running the day-to-day duties of waste collection and packaging.

The management personnel should also participate in training. They should receive the level of training pertinent to their involvement in the physical operation of the center or program.

All training programs should emphasize the nature and properties of hazardous wastes, use and care of personnel protective equipment, decontamination and personal hygiene. A review and drill of emergency procedures/contingency plan is required. It is extremely important, yet often overlooked, to train all staff on the limitations of the permit or facility, including excluded substances, prohibited practices, etc. All training programs should provide for a regular update session to reinforce safety procedures and provide updated packing information and evaluate operations.

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HOUSEHOLD HAZARDOUS WASTE COLLECTION WORKER TRAINING
FIRST RESPONDER OPERATIONS LEVEL - 8 HOURS

TRAINING CONTENTS:

A. 1. Nature and Properties of hazardous materials and wastes
2. Nature and Properties of household hazardous wastes
→ 3. Identifying hazardous materials
4. Incompatibles/Risks associated with
Audio/visual: ChemSafe videos and handouts

B. Toxicology of Hazardous Wastes
1. Routes of Entry
2. Classes of Hazardous Wastes and their effects on human health
Audio/visual: Introduction to Toxicology

C. Hazard Communication
Audio/visual: Safety Triangle
Test

D. Health and Safety Procedures
1. Selection of Personal Protective Equipment (PPE)
2. Use and care of Personal Protective Equipment
3. Use of PPE in an emergency
4. Personal hygiene
5. Respiratory Protection
6. Site Safety Plan
Audio/Visual: We've Got You Covered, Respiratory Protection
Test

E. Operational Procedures
1. Goals/Objectives
2. Wastes handled/not accepted
3. containers used
4. container handling
5. bulking/packing techniques
6. labeling/marking/storage
7. public relations
8. proper lifting
Audio Visual: Preventing On-The-Job Back Injuries, Safe Container Handling

F. Emergency Procedures
1. Site Safety Plan
2. Notification and Request for Assistance
3. Recognition of emergency procedures
4. Emergency control and containment procedures
a. minor spills, other releases
b. major emergency such as fire or uncontained release
c. personal injuries
5. Use of emergency response guide book
6. List of company emergency phone numbers

G. Decontamination Procedures
1. Routine decontamination
2. Emergency decontamination

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TRAINING OUTLINE - 40 HOUR FIELD CHEMIST/TECHNICIAN TRAINING

I. INTRODUCTION - 4 hours

A. Company information, goals, philosophy

B. Regulatory Agencies, Laws, Regulations

1. Hazardous Waste Operations and Emergency Response, Final Rule, 29 CFR Part 1910
Employee Training Assignments

2. EPA/D.O.T./OSHA

3. Hazardous Waste Generators, Transporters, Treatment, Storage, Disposal Facilities

4. Hazardous Waste - Definitions
Identification and Listing
Waste Code Lists

5. Hazardous Materials - Definitions
Hazardous Materials Table
D.O.T. Hazardous Classes

6. Hazardous Substances
Reportable Quantities

7. Transporting Hazardous Waste
Manifesting wastes

8. Land Disposal Restrictions

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SELECTING A SITE FOR A ONE-DAY AND PERMANENT HOUSEHOLD HAZARDOUS WASTE COLLECTION

Eric Laut

An important factor in the efficient operation of and maximum participation in a Household Hazardous Waste (HHW) program is the selection of a collection site of ample size and proximity to a target program population.

The following areas should be addressed in site selection of a HHW one-day and permanent collection:

Selecting a One-Day HHW Collection Site

Facility Size:

The size of the collection site is normally determined by the population of the community and expected participant turnout. The facility size can be determined historically (from the number of cars serviced in past collections and extrapolating an increase in participation) or, if no historic data is available, by assuming an approximate 3% household participant turnout.

The average participation rate of a first time HHW collection program is approximately 1% of the households. However, a 3% participation rate should be assumed to offer a "cushion" in case of heavy turnout.

A community can, in part, calculate the size of the collection site needed by measuring an average car length and multiplying it by the number of participants' vehicles encountered if 3% of the households participate.

In determining an ideal HHW collection site, a community must also consider intended activities and necessary equipment needed to support the activities. Consider the following:

- An onsite hazmat/fire/police team
- Recycle/exchange programs
- Roll-off boxes for solid waste refuse
- Tents used for packaging/bulking
- Hospitality areas
- Overflow lanes for traffic backups
- Survey stations and education display areas

All of the above augment and/or expedite the HHW collection program but will, however, require additional working area to implement. This additional work space must be taken into account when considering facility size.

Access and Egress

A HHW collection facility must have an entrance and an exit to provide for smooth traffic flow or be of sufficient size to provide for the redirecting or looping of traffic into and out of one exit.

Central Location

Historically, participants of HHW programs will travel a maximum of 10 miles to participate. Communities should endeavor to locate their HHW collection site within 10 miles of the most populated areas to insure maximum participation.

Removed from Major Traffic Patterns

To prevent congestion and possible public liability, HHW collection sites should be located somewhat remote from major traffic areas (downtown and shopping areas, etc.). Increasing police participation for traffic control will permit locating a site in a more congested area, but this should be considered the exception rather than the rule.

Collection Site Surface

The surface of the HHW collection site should be hard and not easily permeated. Spills do occur on the site surface, no matter how careful the contractor or volunteers handle the wastes, or how well the site surface is protected. Sealed concrete or asphalt is preferred because these surfaces minimize absorption.

Many HHW programs involve the shuttling of wastes from participant vehicles to receipt tables. This activity is done primarily by a lab cart which is difficult to maneuver or roll through gravel or other soft surfaces.

Sheltered Sites

Whenever possible, collection sites should have a roof and four walls. Sheltered sites, preferably with heat and electricity, have many advantages over open-air or tent collection facilities:

- Guard against inclement weather (rain, wind, cold).
- Provide light for extended packaging by contractor.
- Lessen risk of chemicals inadvertently washing into surrounding storm sewers.
- Provide safer overnight storage.

Sheltered facilities rarely have enough ventilation to allow cars to pass through the building due to exhaust fume buildup, but provide the best option for worker safety and household hazardous wastes.

Considerations for Permanent HHW Collection Sites

The following should be considered in siting a permanent HHW collection site:

Zoning
Communities should thoroughly investigate the zoning laws in the prospective permanent site before construction occurs. Improper siting of a permanent site could result in costly time and facility relocation expenses.

Building Permits
Proper building permits may be necessary if the permanent facility is new construction, or if an existing building reconstruction significantly affects the building structure.

Facility Size

The permanent HHW site should be of sufficient size to collect and store wastes long enough to allow for economic transportation and disposal of wastes. Many communities misjudge participation levels and the amounts of wastes necessary to store to realize transportation and disposal economics. Bulking and small scale treatment programs are sometimes not possible because of permanent facility size constraints.

The access/egress, central location, surrounding traffic patterns, and size of open area around the permanent site are not as important in permanent program site selection considerations as they are in one-day collection events. In a permanent collection program, the participants are staggered and the program is recognized as permanent, so there is no overriding need for participants to rush to deposit their household hazardous wastes. Congestion is eased and the importance of some one-day collection site considerations is diminished with the permanent program.

Overall, the selection of a one-day or permanent HHW collection site is a salient issue in the organization of a collection program. The wrong site selection may result in long lines, irate participants and safety problems. The correct site selection accentuates the positive features of the HHW program and provides for an efficient and organized HHW program.

Load Checking

Cedar Kehoe
Sanitary Fill Company, 501 Tunnel Avenue, San Francisco, CA 94134

Introduction

Amendments to Title 23 of the California Code of Regulations (CCR)[1] require solid waste disposal facilities to implement a periodic load checking program. These programs must be approved by the Department of Health Services and the Regional Water Quality Control Board. The elements of a load checking program have been outlined by the Environmental Protection Agency.[2]

In order to ensure that prohibited wastes[3] are prevented from entering the solid waste stream, the City & County of San Francisco (the City) and Sanitary Fill Company, jointly established the Waste Acceptance Control Program (WACP) to implement load checking in San Francisco. The WACP is designed to meet the very specific needs of the San Francisco Solid Waste Transfer and Recycling Center (SFSWTRC), which is owned and operated by Sanitary Fill Company and processes all of San Francisco's solid waste. The program elements of the WACP were approved by the San Francisco Board of Supervisors in November 1988.

The WACP was specially designed for San Francisco, a county that hauls its solid waste 60 miles to the Altamont Landfill in Alameda County. The contractual agreements between the City, Sanitary Fill Company, and Oakland Scavengers, a division of Waste Management, Inc. and the owner of the Altamont Landfill, were the primary considerations driving the development of the WACP; many features of the WACP may not be applicable to programs in other counties and states. This paper aims to provide the reader with an understanding of the essential elements of a load checking program and is supplemented with ideas for program elements to expand or improve the success of programs in other areas.

Essential Elements

The minimum elements for a load checking program include the following. Each of these elements will be covered in detail to provide the reader with the tools necessary to develop a load checking program.

- Waste identification criteria
- Customer notification
- Load checking procedures
- Employee training
- Record keeping procedures

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1. Chapter 3, Subchapter 15, Section 2523.(b)
2. Proposed Rule for "Solid Waste Disposal Facility Criteria," Federal Register, 8/30/88.
3. Prohibited wastes include hazardous waste, liquid waste, designated waste, and infectious waste.

Waste Identification Criteria

This section of a load checking plan should consider the types of wastes that can be accepted at the facility, the types of wastes that are prohibited, and the methodology for determining whether a particular waste type can be accepted.

Acceptable Wastes

The types of wastes that are acceptable at the facility should be listed in the facility's permit to operate. Acceptable items generally include refuse, non-hazardous solid waste from industrial sources, demolition waste, and empty, dry household-hazardous-waste containers of one gallon or less in volume.

Prohibited Wastes

Prohibited wastes may include hazardous waste, designated waste, infectious waste, liquid waste, dead animals or parts, and sludges.

In California, hazardous wastes include those wastes that exhibit any of the criteria set forth in Title 22 of the CCR.[4] In addition any waste considered hazardous pursuant to the Resource Conservation and Recovery Act (RCRA)[5] is also considered hazardous waste under California state law.[6]

Designated wastes are those materials identified by the Regional Water Quality Control Board as potentially posing a danger to the waters of the State. Designated wastes are in a separate category from hazardous wastes in that they either do not meet the federal or state criteria for hazardous waste or are allowed to be managed under a variance. Common examples of designated wastes include oil-field drilling fluids, sewage sludge, incinerator ash, and non-friable asbestos. Pursuant to Title 23 of the CCR,[7] designated wastes must be managed at special facilities classified by the California Regional Water Quality Control Board as "Class I" or "Class II" waste management units.

Infectious wastes are those that have the potential for causing infection or disease and, as such, are subject to special handling procedures pursuant to Title 22 of the CCR.[8] Examples include laboratory wastes, etiologic agents, pathologic specimens, surgical specimens, human dialysis waste material, and contaminated equipment.

Methodology

A methodology to determine if wastes are prohibited must be developed and followed. Staff must be trained to be able to determine the acceptability of wastes that are brought to the facility for disposal. Evidence of prohibited waste is not always obvious; asbestos-containing waste, sandblasting sand,

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4. Article 11, Chapter 30, Division 4. (Section 66693 et seq.)
5. 42 U.S.C, Section 6901 et seq.
6. Sections 25143.2 and 25159.5 of the California Health & Safety Code.
7. Section 2552 of Subchapter 15.
8. Article 13, Chapter 30, Division 4. (Section 66835 et seq.)

Methodology (cont.)
and contaminated soils are only a few of the questionable waste types that need special handling time and procedures.

The primary activity of San Francisco's WACP is the surveillance of incoming wastes and return or removal of prohibited wastes. Load checkers observe the unloading of solid waste by commercial garbage trucks, transfer trucks, refuse hauling trailers, and the general public.

When setting up a load checking program, garbage collectors, scalehouse staff, material recyclers, and equipment operators at the facility should be trained to identify prohibited materials and alert a designated person when loads are suspected of containing prohibited wastes. Employees should be instructed to flag suspicious loads and notify appropriate staff at once. Inspection of a load should be performed before any waste is unloaded from a vehicle. If a load contains a great deal of prohibited waste, or it cannot be segregated, personnel must have the authority to reject the entire load.

Once the load is inspected and prohibited wastes are discovered, a decision process begins. This process includes one or more of the following activities: (1) questioning of the customer or driver; (2) physical assessment or review of product labels, if available; (3) waste characterization; and (4) answering questions from customers. Waste characterization is usually performed by means of qualitative analysis; it can consist of quick pH and flammability tests to determine the waste's hazard class. In some cases, a more extensive assessment (e.g., HazCat™) may be required.

In San Francisco, WACP staff members regularly survey collection routes while riding along with a garbage or recycling truck and observe the trash for segregation of prohibited waste. Garbage collectors and recyclers attach special tags to any hazardous waste. The tagged waste is then left with the resident. These tags identify the waste as unacceptable and give a phone number for more information. Although garbage collectors are trained to inspect the trash, the involvement of the WACP staff encourages cooperation and communication between both parties and can be used to ensure the garbagemen's participation in the program. This type of interaction is necessary to have a genuinely successful program.

Customer Notification Program

Customer notification is designed to describe and explain the policy and procedures of the facility regarding the acceptability of waste. Some effective methods include posting signs, mailing notices, distributing decals, and providing handouts. The posting of prominent signs at the facility is essential. Signs should depict examples of prohibited wastes and inform customers that any load brought to the facility is subject to inspection. Notification programs can include sending regular customers a printed notice of the policy and

Customer Notification Program (cont.)
program goals. If a company offers debris boxes or other refuse containers for rent, decals can be placed on them to inform customers that prohibited wastes are not acceptable. Handouts, distributed at the facility to all incoming vehicles, have also been successful.

Load Checking Procedures

A load checking program should consider (1) the number of loads of incoming waste that will be checked, (2) the source of loads subject to inspection, (3) the frequency of inspections, (4) the level of thoroughness, and (5) the method for determining how loads will be selected. Management decisions are required regarding the random selection process and the definition of *random*. Will compacted loads from municipal sources be checked? Or will only uncompacted loads from single sources be checked? (i.e. those that can be tracked back to the generators.) Procedures to contact generators will depend on whether the generator is present when unacceptable waste is discovered. If the generator is present, the waste should be returned immediately with an explanation of the problem. If the generator is not present, staff must determine the generator of the waste, contact her, and make arrangements for the removal of the waste from the facility. Prohibited wastes discovered as a result of any waste identification activities should be separated from the solid waste stream and stored temporarily until they are either picked up by the generator or properly packed and hauled for disposal as hazardous waste.

Procedures for the actual load inspection will vary depending on location. One method is to request the driver to discharge the wastes by pulling forward and unloading the wastes into a windrow in a selected area. The driver is required to remain at the site to provide information on the load while the inspection is conducted. The windrow is dissembled, and the load is carefully examined for the presence of prohibited wastes.

In addition, the newly proposed regulations amending Subchapter D of RCRA require the checking of any "suspicious loads" which might come to a landfill for disposal. All loads which appear suspicious (e.g., smoking or strong odor) should be examined for hazardous materials. Driver behavior may also be used as an indication that loads may contain hazardous materials.

Site surveillance is an essential component of any program designed to exclude hazardous wastes. Surveillance implies a high degree of visual inspection of incoming wastes at the facility by all work crews trained in the recognition of hazardous materials. Surveillance serves as a deterrent for the customer who may deliver prohibited wastes. It can occur, to varying degrees, at all areas of the facility where waste is screened, dumped, or otherwise handled. To be successful, site surveillance must be the responsibility of all employees working at the facility.

Handling Procedures

In San Francisco the management and storage procedures for prohibited wastes removed from loads fall into three categories.

1. The general public using the SFSWTRC come to unload their household refuse at the Public Disposal Area; the generator is usually the person delivering the load of material. If waste is identified as unacceptable by work crews or load checkers, the person is prohibited from discarding the material. Residents of San Francisco have the option of taking the material to the nearby Household Hazardous Waste Collection Facility.

2. For situations in which the generator of prohibited wastes must be contacted and asked to drive to the SFSWTRC to pick up the waste, the waste is segregated by hazard class and temporarily stored in a specially designed containment shed, the HazBin. This storage area has the following safety features: (a) three separate storage compartments for flammables, acids, and bases, (b) correct DOT hazard placards and Proposition 65 warning signs,[9] (c) a grated floor for double containment, and (d) plenty of ventilation and shelving. Once notified by telephone, the generator makes arrangements to pick up the waste.

A key aspect of the San Francisco load checking program is the City's role to ensure that identified generators of prohibited wastes do not improperly dispose of such wastes in the municipal solid waste stream. If the alleged generator refuses to pick up the materials, the City is contacted with information and asked to follow up the incident. Thus, if Sanitary Fill Company is unsuccessful in obtaining their cooperation the City's enforcement efforts begin.

3. Prohibited wastes delivered to the SFSWTRC that cannot be traced to a generator are considered *abandoned waste*. These wastes must be characterized and properly packaged for disposal at an appropriate facility. Characterization requires a chemist who can identify unknown materials using qualitative analysis, categorize the wastes into their proper hazard class, and prepare them for shipment by a certified hazardous waste hauler to a licensed hazardous waste facility.

Employee Training

Training for a load checking program must be tailored to each employee according to his or her respective responsibilities; it is important that all facility personnel receive some degree of training. Personnel assigned to manage the program should be trained in a wide range of topics, including (1) waste characterization analysis, (2) methods for the containment and removal of prohibited materials, (3) identification and classification of prohibited materials, and (4) regulatory reporting requirements.

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9. One purpose of Proposition 65, a California law initiated by ballot proposition, is to notify workers of their contact with deleterious compounds.

Employee Training (cont.)

In addition to load checking staff, the WACP provides training for waste-handling personnel at Sanitary Fill Company, garbage company employees, City employees, major customers, and community groups. Garbage collectors are educated about potential health hazards associated with handling hazardous waste, procedures to follow when hazardous waste is found, and whom to contact if the problem is serious. City employees are informed of the evolving solid and hazardous waste disposal agreements and restrictions, enabling them to educate the public about San Francisco's disposal policies. Programs dealing with hazardous waste are complex and detailed, and these information sessions are helpful in maintaining consistency when answering the public's questions.

The WACP staff also gives presentations to community groups, including information about the following: (1) definition of household hazardous waste and examples of common household products containing hazardous ingredients; (2) potential risks associated with handling hazardous materials, including asbestos; and (3) alternatives to using hazardous materials. Residents also receive information on the San Francisco Household Hazardous Waste Collection Facility in these presentations.

Record Keeping Procedures

A load checking program will generate a variety of records, including those required by applicable regulations and operating permits. Such records must be maintained by management in compliance with applicable regulatory requirements. In addition, they provide a database for use in evaluating a load checking program. Records may include (1) permits and variances, (2) surveillance and load checking documentation, (3) incident reports, and (4) training records.

Load checking records for each inspection should include, but not be limited to, the following information on a form: (a) date and time of inspection; (b) location where the inspection was conducted; (c) name of hauling firm or vehicle identification; (d) address and phone number of source, if known; (e) type of business, if known; (f) type of prohibited waste identified; (g) type of alleged activity at issue (e.g. dumping, leaking, spillage); (h) brief summary of the incident; and (i) signature of the employee who filled out the form. This information can be compiled into a monthly summary and used to identify customers who repeatedly attempt to dispose of prohibited wastes. ■

BATTERY LEGISLATION AND STUDIES

NANCY MISRA
Supervisor, Special Wastes Unit
Minnesota Pollution Control Agency

In 1989, the Minnesota Pollution Control Agency began a two year study on household batteries and their impact on the waste stream. This study is being funded by the Legislative Commission on Minnesota Resources, a commission of our state legislature which grants funding for select resource projects. A main objective of this study has been to identify the types of batteries which enter the household wastestream and attempt to quantify the numbers of batteries and the amount of heavy metals contributed to the waste stream through these batteries. A second objective was to examine feasible battery collection mechanisms for specific types of batteries. An interim report covering the first objective was published in March, 1990.

One of the efforts in the study was to examine the methods by which household waste is routinely disposed, and determine if batteries present an environmental threat. In Minnesota, half of our waste is potentially managed through solid waste incineration. The other half is largely landfilled, although we also have composting activities in certain regions as well. The interim report of the Minnesota study examined the various ways that metals may enter the environment through these practices.

Landfilling of batteries probably poses the least threat to the environment. Yet, there have been studies that showed that batteries do deteriorate in landfills and the metals may leach out over long periods of time. In composting situations, the heavy metals in batteries can affect the quality of the compost and limit its use. However, the most common and immediate concern arises when examining incineration of batteries. Since metals are not destroyed in this process, they end up in the ash, or in the case of mercury, in the air emissions. Studies in Minnesota and other states have shown that the largest new source of mercury into lakes is from airborn mercury which falls in the form of rain or snow. Research from the Great Lakes States has shown that very small amounts amounts of mercury (as little as one gram) in an average sized lake can be enough to trigger advisories on fish consumption.

This study is one of the few which has provided information on the quantity of metals entering the waste steam from household batteries. A significant finding of the study was that alkaline batteries were a major source of mercury in the waste stream. Although individually these batteries do not contain enough mercury to make them candidates for recycling, they are consumed in such large numbers that the total mercury loading is significant. Carbon zinc and mercuric oxide (button) batteries also contibute mercury but in much smaller amounts.

Nickel cadmium batteries have already been shown to be a major source of cadmium in the household waste steam. This is particularly of concern when coupled with the fact that consumer use of these batteries is growing at a very high rate. It has become common to promote the use of these batteries as an environmentally preferred alternative to alkaline or carbon zinc batteries.

However, cadmium is a carcinogen, and hence, a metal of concern when discussing disposal practices. When batteries are incinerated the cadmium ends up this the ash that must then be land disposed.

In Minnesota we chose to look into the issue of waste battery management by examining alternatives to collection. While battery collection is usually the first alternative considered when attempting to remove batteries from the waste stream, we felt that there were many problems associated with battery collection, and hence, other alternatives were explored. The problems which must be considered when collecting batteries include the following:
1) How will collected batteries be managed? Are they to be managed as a hazardous waste? If not, what are the alternatives?
2) What will it cost to collect and process or dispose of the batteries? Is there a source of funding available? Who bears the cost?
3) Are there viable and realistic recycling mechanisms available for the types of batteries being collected? Not all battery types are recyclable. Some battery types are recyclable but not in the United States.
4) Who will bear the liability that inevitably accompanies disposal or processing of special wastes such as batteries? Who will investigate the environmental record of the facilities being used for waste battery management? These questions and others are important to resolve before initiating any sort of battery collection program.

After exploring various options, the Minnesota Legislature chose to pursue a source reduction mechanism as the the preferred choice for managing batteries. Alkaline batteries were also targeted as a type of battery that needed immediate attention, due to the fact that our interim report indicated that alkaline batteries contributed over 90% of the mercury coming from all types of waste batteries. This effort as well as an effort to establish a mechanism for dealing with industrial batteries and a move to mandate that rechargable batteries be made removable from appliances which house them, all became major provisions of a bill that was passed in the Spring of 1990.

The Minnesota law has four subparts. The following is a brief description of these parts.

1) Industries, governmental units, medical facilities, and communications facilities are prohibited from disposing of the following types of batteries in mixed municipal solid waste: mercuric oxide, silver oxide, nickel cadmium, and sealed lead acid batteries.

Instead, the manufacturers of these batteries must establish a system for collecting, transporting, and processing of these batteries. The cost must be included in the sales transaction for the batteries. The manufacturers are also required to notify purchasers and users in Minnesota of the system that they have established to do this.

The effective date for this provision was August 1, 1990.

2) The manufacturer of any button cells sold in Minnesota after January 1,1991, shall ensure that each battery is clearly identifiable as to the type of electrode used in the battery.

3) Any alkaline battery sold in Minnesota after January 1,1991 cannot contain more than 0.3% mercury by weight.

Any alkaline battery sold in Minnesota after February 1,1992 cannot contain more than 0.025% mercury by weight. (This represents about a 95% reduction in the mercury content of batteries manufactured at the beginning of 1990)

We are avare that there are alkaline batteries available in Minnesota that already meet the 1992 mercury content limits.

4) Any appliance sold in Minnesota which contains a rechargable battery, must be manufactured such that the battery is easily removed by the consumer. The product and the battery muct both be labeled to indicate that the battery much be recycled or disposed of properly.

The effective date for this provision is July 1, 1993.
Given that over 80% of nickel cadmium batteries are housed in such appliances, an effective collection and recycling program is difficult to design until these batteries are made removable.

We are seeing an effort by the battery industry to achieve compliance, in some cases even ahead of schedule, for these requirements. There will most likely be further legislation proposed in Minnesota in the coming year to address methods for collection of button batteries and nickel cadmium batteries. In the meantime, both the industry and governmental units need to focus on what methods are available to process mercury and cadmium containing batteries. At this time, Minnesota has limited our approval of processing facilities for mercury containing batteries to only one in the United States. And even that facility is one that we have some concerns about. There are no processing facilties for nickel cadmium batteries in the United States at this time. This is a serious concern if many states or communities turn to collection and recycling of these batteries.

It is clear that there are many remaining questions and issues regarding sound vaste battery management. There are issues of more environmentally sound alternatives, better and more processing facitlities, and more awareness by the public that battery purchasing and use habits must be improved. We are also anticipating and observing the beginnings of mercury-free batteries, battery return programs established by the manufacturers, and improved design of battery containing products.

Contribution of Metals from Household Batteries in Minnesota in 1985

Battery Type	Mercury (tons)	Cadmium (tons)
Button	1.3 - 1.85	
Carbon-Zinc	0.012 - 0.6	
Alkaline	23.2 (10.7 estimated for 1990 mercury content and sales projections) (0.5 for 1990 if 0.025% limit were in place)	
Nickel Cadmium		0.39 (6.9 projected based on 1990 sales)

Minnesota Battery Law (April 1990)

1) Industries prohibited from putting the following types of batteries in mixed municipal solid waste:

   - Nickel Cadmium
   - Mercuric Oxide
   - Silver Oxide
   - Sealed Lead Acid

   The manufacturers must develop a system to collect, transport and process these batteries, and notify users of their system.
   Effective: August 1, 1990

2) Button cells sold in Minnesota after January 1, 1991, shall be marked to identify the type of electrode in the battery.

3) By January 1, 1991, no alkaline battery sold in Minnesota can contain over 0.3% mercury by weight.

   By February 1, 1992, no alkaline battery sold in Minnesota can contain over 0.025% mercury by weight.

4) Any appliance containing a rechargeable battery must be manufactured such that the battery is easily removable by the consumer. Effective: July 1, 1993

Overview of Dry Cell Battery Collection Programs

Nancy Zahedi, Office of Solid Waste, USEPA

Introduction

Dry cell batteries make up only 0.014% of municipal solid waste by volume and 0.08% by weight, but are a major source of the heavy metals mercury and cadmium in the municipal solid waste stream. Concerns about dry cell batteries first gained momentum in Europe and Japan where efforts were made to remove batteries from the waste stream through a variety of methods such as collection programs, battery deposits or surcharges, and most recently through legislation. In 1987, the first U.S. program to specifically divert dry cell batteries from the municipal solid waste stream began in New Hampshire/Vermont in an area where a new incinerator had been built.

Overview of Collection Programs

There are four main collection methods that can be used to collect household dry cell batteries:

(1) Household Hazardous Waste Collection Programs: dry cell batteries can be collected as part of an existing household hazardous waste collection program.

(2) Drop-off Points: Retail outlets are popular drop-off points for used batteries. Some retailers who replace batteries in such items as watches, hearing aids, and cameras already collect the batteries for recycling. Thus, it is possible to work with retailers who sell items that require batteries to set up a collection point. Other drop off points such as recycling centers, schools, and public libraries have also been used by communities to encourage separation of household batteries.

(3) Curbside Collection: Curbside collection allows individuals to separate their batteries from other wastes for pick-up at the curb. This is the most convenient option for individuals and can be incorporated with curbside collection of other recyclables.

(4) Targeted Population Collection: A targeted collection focuses on those population groups that are high volume dry cell battery users, e.g.,the elderly or other hearing aid users, photographers, professional tradesmen, parents whose children use battery operated toys. By targeting these groups (e.g., by working with hearing aid stores or senior citizen centers), it may be possible to capture a significant number of batteries out of the waste stream or to target specific types of batteries such as the mercury button batteries.

The following are descriptions of some of the battery collection programs that have been implemented by communities around the country. These program descriptions are not inclusive of all the different programs in the country, but show the range of approaches that have been used and the different motivating factors, types of batteries targeted, collection methods, and disposal options used.

A. New Hampshire/Vermont (NH/VT) Solid Waste Project
Contact: Carl Hirth (603) 543-1201

Drop-off Collection Points/All Batteries

The NH/VT Solid Waste Project was one of the first battery collection programs in the country. The purpose of this program was to divert mercury from the Waste-to-Energy (WTE) facility as well as to recycle selected batteries. The project began collecting all types of household batteries in May 1987 by establishing locations where the public could drop off batteries. The NH/VT project covers 28 towns of a predominantly rural nature, with a total population of 72,000 people.

There are currently a total of 74 collection sites for batteries at stores, government offices and recycling centers. In retail stores, a 5-quart silver bucket with the Project's battery collection logo is located adjacent to the store's battery display to encourage consumers to return their used batteries. Local civic organizations such as the League of Women Voters, RSVP (senior citizens), and the Boy Scouts collect the batteries on an occasional basis.

Collected batteries are initially stored at about a dozen municipal transfer stations before being consolidated at one of two sites: the Wheelabrator WTE facility or the Claremont, New Hampshire Transfer Station. The Project initially anticipated recycling the mercury button batteries by separating them from the other batteries collected. Local civic groups such as the Boy Scouts would have sorted the batteries. However, due to the small number of recyclable button batteries collected relative to non-recyclable batteries and concerns about hazards associated with hand sorting the mixed batches of batteries, this plan was dropped. Instead, collected batteries have been disposed of by a contracted hazardous waste company at a hazardous waste landfill at a cost of about $300 per 55-gallon drum. Collected batteries are disposed of twice a year.

To-date, a total of 11.4 tons of household batteries, or thirty-five 55-gallon drums, have been collected and disposed of. The volume of batteries collected has increased over time, but the

NH/VT Project estimates that it has captured only an estimated 10%[1] of the total volume of batteries discarded during this period in the Project area. This is a relatively high capture rate for the voluntary nature of the program. On the other hand, it is a low percentage capture rate because the battery collection program is only a small part of the NH/VT Project programs. It has a low priority in terms of funding, staffing and publicity.

The NH/VT Solid Waste Project continues to collect all types of household batteries. However, the Project has considered the possibility of limiting collection to button batteries because these are recyclable and the costs of disposing of all collected batteries is high. The significant reductions in the mercury content of alkaline batteries since 1987 also raises questions about the desirability of collecting all batteries--particularly with the relatively low capture rates experienced by the Project.

B. Household Hazardous Waste Project, Southwest Missouri
Contact: Marie Steinwachs (417) 836-5777

Public Education/Button Battery Collection

Since there are no incinerators in Missouri, diverting batteries from a municipal incinerator was not a primary motivation for the Household Hazardous Waste Project's button battery collection program. The Household Hazardous Waste Project was concerned more generally about toxic metals entering the waste stream from household sources.

Due to the limited availability of staff and funding, the Project decided to promote household battery collection by educating the public about where they could take used batteries. In contrast to collection programs such as the NH/VT Solid Waste Project, this program merely publicized retailers that were already collecting batteries and did not establish its own drop-off points.

In Spring 1988, Household Hazardous Waste Project staff contacted retailers in a 23 county area who were already collecting household batteries--e.g., jewelers, hearing aid stores, pharmacies, camera stores and other businesses--to ask whether they would be willing to be included in the Project's recycling directory which was widely distributed to the public. More than 50 retailers agreed to participate in the program. Since the retailers were only collecting mercury and silver-oxide button batteries for recycling, the collection program was limited to button batteries.

No data was collected on the program. Responsibility for disposal/recycling of the batteries rests with individual retailers

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[1]The 10% estimate is based on the national average of 8 batteries disposed per person per year.

and not with the Household Hazardous Waste Project or participating communities. Now that the recycling directory lists have been established, the communities in the 23 county area update their own lists. The costs of the initial effort were minimal, basically requiring several hours time for identification of retailers, and can be done using volunteer help. Publicizing retailers who accept batteries is combined with the printing of the recycling directories and thus, imposes few additional costs.

C. Hennepin County, Minnesota
Contact: Mark Oyaas (612) 348-6157

Pilot Comparative Collection Programs/All Batteries

Hennepin County's battery collection program is the largest scale collection program in the U.S. serving a population of about one million or one-fourth of the State's total population. There are 47 municipalities in this county which includes Minneapolis and surrounding suburbs. Concerns about emissions of heavy metals from the county's Municipal Waste Combustor prompted a two-part pilot program in 1988 to divert all types of household batteries from the incinerator.

Two suburbs, each with a population of about 20,000 people, were selected to test different collection approaches. In one community, mixed household batteries were collected over a 10-month period in drop-off buckets placed at retail stores. The program was publicized through newspaper inserts and other promotions. In the other community, household batteries were collected at the curbside on two different dates, less than 5 months apart. Each household received a direct mail flyer and, with instructions to place the batteries in a washed 1/2 gallon milk carton or 1-quart ziplock-style plastic bag on top of their recycling container on the specified battery collection dates.

As part of the pilot program, comprehensive data was collected on the numbers and types of batteries collected. A total of 173 lbs of batteries were collected through retail drop-off as compared to 404 lbs from curbside collection. The curbside program therefore resulted in a greater weight (and number) of batteries collected over a shorter period of time than the retail drop-off bucket program. Up to six times as many batteries were collected through a single curbside collection as compared to retail store containers over a three month period.

Ninety-three percent of all collected batteries were the non-recyclable alkaline or carbon-zinc. The county received permission to store collected batteries up to a one year period at a Public Works Garage. Batteries were separated by type, stored in different barrels and marked as hazardous corrosive materials. The seven 55-gallon drums of batteries collected during the pilot program were all disposed of as hazardous waste at a cost of $700

per drum.[2] Mercury emissions from stored batteries were monitored and found to be a potential concern.

Retail Collection/Button Batteries

Due to the limited recycling options, concerns about possible storage risks, and higher percent of mercury by weight in mercury and silver-oxide button batteries, Hennepin County decided in January 1990 to focus its collection of batteries to button cells. Button batteries are collected at more than 150 collection points throughout the county that include retailers such as jewelry and photography stores. Newspaper ads, window cards, handouts, flyers distributed at senior citizen centers, and counter displays at participating stores are used to publicize the program. Collected button batteries are sent to a recycling company. The cost of purchasing collection boxes and developing brochures and posters has been about $5000, not including staff time.

Six months after collection of button batteries began, the program had received 107 lbs of button batteries as compared to less than 3 lbs collected during the entire pilot program. Only 35% of these are estimated to be the recyclable mercury and silver-oxide batteries. Revenues from the recycling of these batteries is not expected to offset the costs of the program.

Curbside Collection/All Batteries??

In October 1990 curbside collection of all batteries began in the City of Minneapolis, which has over 100,000 households. This collection is modelled after the pilot curbside collection, with the main distinction being that the recyclable batteries would not be disposed, but hand sorted and sent to a recycling company.

D. Recomp of Washington
contact: Lisa Schnebele (206) 384-1057

Retail Collection/All Batteries

The Thermal Reduction Company (now Recomp of Washington) Waste-to-Energy facility began operations in 1988 in Whatcom County, Washington. This county has a population of about 120,000. The high level of public concern about waste in general and incineration in particular motivated the company to help the public identify problem wastes and offer solutions for dealing with these wastes. The presence of mercury and cadmium in dry cell batteries and the opportunity to help promote the county's existing household hazardous waste collection program were motivating factors in

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[2]This was much higher than the county could have negotiated with another vendor, but the one year limit for storing batteries had almost expired and there was insufficient time for alternative arrangements.

establishing a battery collection program.

The program was set up in September 1988 so that batteries would be collected at local retail stores. About 45 retailers in Bellingham and parts of Whatcom County agreed to participate in the program. They received a bucket for the batteries and promotional materials which included a poster, flyer, stickers, and information on the household hazardous waste program.

Originally, the program planned to only collect the button and nickel-cadmium (Ni-Cd) batteries, for which recycling markets existed. However, the first seven months of the program showed that the public did not distinguish between the recyclable and non-recyclable batteries and all types of batteries were being dropped off in the collection buckets. As a result, in April 1989 the program began to collect all types of batteries.

One staff person from Recomp manages the battery collection program. Batteries are collected every 3 months from most retailers, with more frequent collections when needed. Once collected, batteries are manually sorted into two categories: (1) alkaline/carbon-zinc and (2) Ni-Cd, button cell, and lithium batteries. All batteries are stored at the WTE facility.

To-date, a total of eight 55-gallon drums of batteries have been collected. Seven of the drums are alkaline/carbon-zinc batteries and one drum contains all the other types of batteries collected. The drum of recyclable and lithium batteries will be sent to a recycling company. The remaining 7 drums of alkaline/carbon-zinc will be sent to a hazardous waste landfill.

The costs of the program have included about $3000 to develop the promotional materials and purchase containers for the batteries. In addition, the program has required one staff person part-time. No disposal costs have been incurred yet.

The main problem faced by the program has been the lack of markets for the alkaline and carbon-zinc batteries. The advantages of the program include diversion of collected batteries from the facility, increased public awareness about problem wastes, and the promotion of proper disposal of household hazardous wastes.

E. Warren County Pollution Control Financing Authority, NJ
Contact: Mary Briggs, (201) 453-2174

Recycling Center and Curbside Collection/All Batteries

Warren County, New Jersey is an agricultural county of 23 municipalities with an estimated population of 94,000. The State's first operational resource recovery facility is located in Warren County. Excessive cadmium levels in the incinerator ash requiring that the ash be handled as a hazardous waste and high mercury air emissions provided the impetus for the Warren County Pollution

Control Financing Authority (PCFA) battery collection program which began in June 1989. The cost of disposing of one batch of ash that fails toxicity tests is $223,000.

The battery collection program began with a one-year pilot that established 3 retail drop-off collection points at one of the more populated towns in the county. Newspaper articles and posters at the collection points publicized the program. All types of batteries were collected because the PCFA felt it would be too difficult for the public to distinguish between the different battery types.

The batteries were picked up at the 3 collection points on a monthly basis, and sorted and counted during the first 6 months. A total of three 55-gallon drums were collected in the first four months and another four drums in the next 6 months. The decision was then made to collect batteries county-wide and to associate the program more closely with recycling.

In June 1990, the county-wide collection program began. Batteries are collected in one of two ways: at recycling centers in fourteen municipalities and through curbside collection in nine municipalities. A total of $50,000 has been budgeted for the first year of the county-wide program which includes the salary for one staff person who collects and sorts batteries, purchase of a collection vehicle, development of promotional materials and purchase of barrels for collected batteries.

A publicity campaign was mounted in June 1990 to kick off the county-wide program. This included mailers sent to households through the schools, press releases, posters provided to recycling coordinators in each municipality, and a newsletter sent to every household in the county with major articles about the battery collection program.

Batteries are collected in 15 gallon containers at the municipal recycling centers. These are then picked up by the program's staff person and brought to the County recycling center where they are stored in a shipping container. Those who have curbside collection of batteries place their batteries in a plastic bag on top of the other recyclables. Non-recyclable batteries are sorted from the recyclable button and Ni-Cd batteries and stored until the county's hazardous waste clean-up days every six months, when they are disposed of through the household hazardous Waste vendor.

The cost of hazardous waste disposal has been about $250 per 55-gallon drum. Button batteries have been stockpiled until funding for shipping to a recycling company is available. The program expects that the income from these batteries will probably not cover the cost of shipping. The program estimates it will collect 10 drums of batteries every six months. Ninety-five percent of all batteries collected have been alkaline or carbon-zinc and only 5% have been recyclable button or Ni-Cd batteries.

The program is planning to test the storage site for mercury emissions. If elevated mercury levels are identified, then additional safety precautions will be taken. Currently, the battery storage container is ventilated on a daily basis but permanent ventilation louvers may be installed if needed.

Some Lessons Learned from Existing Programs

1. Communities have had overly optimistic expectations about market availability.

   -- Communities often believed more markets were available for recycling collected batteries and only discovered after the fact how limited the management options are.

2. The majority of dry cell batteries collected in mixed collection programs (i.e., all types of batteries collected) are not recyclable.

   -- 95% or more of collected batteries by weight are the alkaline or carbon-zinc batteries, which are not recyclable.

3. To be able to recycle batteries in a mixed collection program requires the ability to sort collected batteries.

   -- Sorting imposes additional costs (can't be easily done with volunteer labor as used in NH/VT) and creates potential handling risks from chemical burns since batteries react to each other and caustic chemicals can leak out and from mercury vapors in storage areas.

4. Targeted battery collection can result in higher capture rates for recyclable batteries.

   -- If recycling is a major objective of the program, a targeted collection is likely to be most effective. In Hennepin County, 107 lbs of button batteries were collected in six months in the targeted collection as compared to only 3 lbs in the six-month pilot program.

5. Nickel-cadmium batteries are currently difficult to collect for recycling.

   -- Ni-Cds are theoretically recyclable, but are difficult to recycle in the context of a community program because only a small percentage (20%) of the batteries are accessible to consumers and they may be difficult for consumers to distinguish from the alkaline or carbon-zinc batteries (In Whatcom Co. attempts to just collect Ni-Cds and button batteries was abandoned). This will change over time as a result of appliance manufacturer

design changes intended to comply with recent legislation enacted in Connecticut and Minnesota.

6. Recycling collected batteries should not be considered as a means of generating revenue for a collection program.

   -- Even if some or all collected batteries are recycled, this is at a net cost to the program and it is unlikely to yield any net income. Retailers typically were able to recycle certain batteries (mercury and silver-oxide) and generate revenue since there was no collection cost involved; however, increases in the cost of shipping batteries to the recycling companies can now outweigh any income derived from the batteries.

Some Concluding Remarks

Advice for communities interested in dry cell battery collection:

o Be clear about your objectives

   -- Communities considering the collection of dry cell batteries should assess whether diverting toxic metals out of the waste stream is most important goal or whether being able to recycle collected batteries is equally important.

o Know what markets are available and plan your program accordingly

   -- Few recycling markets available for community programs due to minimum quantity requirements, minimum charges for accepting batteries and requirements that batteries be pre-sorted, e.g., that mercury button batteries be sorted from zinc-air and silver-oxide button batteries. Many communities have also been concerned about the reputability and environmental records of some battery recycling companies. At this time, there is really only one company that is best situated to recycle batteries collected through community programs.

   In some cases communities have "stockpiled" batteries believing that they would eventually identify viable recycling markets and then sent most of the batteries to a hazardous waste landfill.

o Keep abreast of legislative and source reduction initiatives that will impact on dry cell batteries.

   -- Redesign of appliances containing Ni-Cd batteries by 1993 (in response to CT and MN legislation) will make collection and recycling of these batteries more viable in the future.

-- Reductions in the amount of mercury in alkaline batteries may make it more critical to focus on **non-household** sources of waste batteries.

As shown in Table 1, household mercury consumption in mercuric oxide batteries was 46.8 tons in 1988 as compared to 42.7 tons for medical/hospital and industrial uses and 83.1 tons for military uses. And the household consumption is expected to further decline. Yet, many of the non-household mercuric oxide batteries may well end up in the municipal solid waste stream. This poses a challenge for community programs to focus not only on household dry cell batteries, but on non-household uses as well.

For those who are interested in more information on dry cell battery collection, the EPA will be publishing a Handbook on the Management of Dry Cell Batteries in January 1991.

TABLE 1

SOURCES AND USES OF MERCURY

IN MERCURIC OXIDE BATTERIES

CALENDAR YEAR 1988

	Tons of Mercury (2,000 lbs./ton)
Sources	
• Used in U.S. production	116.4
• Less exports	5.9
• Plus imports	62.1
• Net total:	172.6
Uses	
• Consumer	46.8*
• Nonconsumer, private sector	42.7
•• Medical/hospital 24.7	
•• Industrial 18.0	
• Military, U.S. and overseas	83.1
• Net total:	172.6

* For calendar year 1990, this figure is estimated to be 32 tons.

Source: National Electrical Manufacturers Association (NEMA)

Defining the Problem:
Household Batteries in Municipal Solid Waste

Presented at the 1990 HHW Conference
San Francisco, CA

by
Donald Seeberger

Americans own some 900 million battery operated devices. To keep these electronic devices running, over $2.5 billion a year is spent to replace the power source - batteries. In most communities, spent dry cell batteries are thrown into the trash and eventually finds their way into a landfill, incinerator or compost facility. There is a potential for the metals contained in dry cell batteries to cause environmental or human health problems if they are released in large quantities. Evaluating the potential risk caused by batteries in a community's waste management system is the first issue a that must address before implementation of a battery collection program.

Rechargeable nickel-cadmium batteries have been identified by the Environment Protection Agency (EPA) as the largest source of cadmium in municipal solid waste (MSW). Household batteries are also known to contribute significant amounts of mercury to the waste stream.

Assessing the risk posed by batteries entering a community's waste disposal system is difficult and imprecise. Much of the information needed to accurately estimate the amounts of metals contributed to the waste stream by dry cell batteries is considered proprietary by the industry and, therefore, is not readily available. Data concerning sales and quantities of metals used per battery, two necessary pieces of information for developing accurate disposal estimates, must be projected from outdated information sources.

Communities that incinerate their municipal solid waste (MSW) were the first to become concerned that household batteries where contributing heavy metals to ash or air emissions. Incinerators do not destroy everything that enters them. Most metals become concentrated in the course residue which remains after burning. Removing waste that contributes significant quantities of cadmium and mercury to the emissions of a waste-to-energy plant is one method of improving the safe operation of a facility. Battery collections are a simple and direct means of removing a problem material from the "normal" waste stream.

As awareness of the amounts of heavy metals contributed to the residential waste stream by household batteries has grown, communities using other waste management methods have become interested in removing batteries from MSW. Assessing the risk posed by batteries when landfilled or composted is difficult to

estimate.

To attain a high quality of compost from MSW, potential contaminates must be removed. For this reason, most MSW composting facilities have developed methods for removing metals from the in coming waste. In composting operations using hand sorting of solid waste, larger batteries are easily identified and removed but small "button" batteries could be overlooked and enter the system. Conducting metals testing on the compost would indicate whether or not additional precautions for removing batteries are warranted.

Batteries that enter a landfill tend to be widely distributed throughout the waste. How quickly a dry cell batteries decays in a landfill depends on a variety of factors, including: the battery's state of charge, soil conditions, and moisture levels. Regardless of the length of time needed for the battery to decay, the metals will remain and may eventually migrate into the leachate. In a modern, well managed landfill, leachate should be collected and treated to prevent environmental problems.

Recognizing that documenting the fate of household batteries in the waste stream is imprecise, the goal of a battery collection program should become problem prevention. Communities interested in establishing a dry cell battery program should begin by evaluating the potential risk household batteries pose to their waste management system. The extent to which a community wishes to eliminate the threat dry cell batteries pose to them and the environment will effect the scale and design of the collection.

Permanent HHW Program Overview

By Dana Duxbury

Solid Waste and Health Departments are the major sponsors — 34 of the 55 in operation at the end of 1990— of permanent HHW facilities.

Most of the facilities are 8' x 20' prefabricated units. Small ones tend to fill quickly — especially if on-site storage is anticipated. And the newer ones include builfdingsd for receiving, sorting and testing and separate pre-fab torage units.

Some have cost only a bit over $2,000 for a remodeled donated trailer; Anchorage spent $1.4 million for a large enclosed building and a satellite site.

Various sites are chosen — landfills and transfer stations predominate.

Fees affect participation — when, as in Anchorage where there is usually a modest fee, participation jumps in May when it is free. Larimer County, Colorado, discontinued its fee and saw an significant jump in the amount of wastes coming in.

Issues to resolve in siting a permanent program include: Who will be the generator, i.e. who will sign the manifests — the sponsor is usaually the generator as opposed to one-day collections where the generator is often the contractor. Who operates the facility? Sometimes a private firm — but in the northeast especially thee contractor has been training employees for the first year and then local employees take over. Is there/should there be on-site storage? Many operate as TSDF's but are not and thus don't need a RCRA permit. Some states are experiencing imposed limits on storage time and thus efficiency of full barrels can be compromised. Some sites have on-site labs.Participation sometimes seems to decline because of the lack of urgency provided by a the regular availibility — thus continued publicity is needed.

Some facilities have opened satellite smaller facilities (Alaska and Colorado) to increase participation and then truck to a central storage site.

We see some problems. Participation, state regulations, lack of space (building too small), funding (funds to establish the facility but then inadequate operating budget), the need to focus publicity for mobile facilities similarly to the publicity for one-day collections in order to maximize participation. People need to know when the periodic visit will be and what materials will be accepted.

PERMANENT HOUSEHOLD HAZARDOUS WASTE FACILITY STANDARDS

NED T. BROOKS

MINNESOTA POLLUTION CONTROL AGENCY

Over thirty permanent programs to manage household hazardous waste (HHW) have been established to date with a significant increase expected in the near future. While three states, Massachusetts, New York and California, established permit guidelines, most facilities to collect and store HHW have been developed in the absence of comprehensive standards. Without specific standards, facilities have been established based on fire, OSHA, RCRA and other guidelines. Such guidelines, however, are intended to address industrial hazardous waste and do not specifically address HHW and facilities built to these standards are possibly over built

An attempt was made, for this conference, to identify areas of agreement as to the appropriate standards for facility development among the sponsors of current permanent programs. In doing so, the focus was on standards necessary to provide adequate protection of personnel and the environment for HHW and not necessarily current standards. The following is an initial attempt at developing a consensus with respect to major design features including impermeable surface, secondary containment, segregation of incompatibles, ventilation, electrical wiring and construction materials.

SECONDARY CONTAINMENT/IMPERMEABLE SURFACE

Waste must be stored in an area that provides secondary containment with the storage area surface impermeable and non-reactive with the waste. Secondary containment is often achieved where a wall meets a floor and by providing a berm or curb around the storage area. A slight sloping of the floor, perhaps into a sump, also achieves containment. Another way secondary containment can be provided is by using a raised grate floor with a containment area underneath. While concrete is impermeable by virtually all HHW, it is porous and therefor may retain residues of spilled waste. Concrete and metal coated with epoxy paint are sufficiently impermeable.

SEGREGATION OF INCOMPATIBLES

Keeping incompatible materials from commingling is one of the primary objectives in hazardous waste management and an important part of facility design and operation. Acids must be kept separate from bases and pesticides and oxidizers separate from flammables. In facilities currently in operation, this has been achieved by physically separating drums of incompatible wastes by a wall or curb, sometimes stored in different rooms. Some maintain, however, that in the case of lab-packed material, physical separation of drums is not necessary as the drum provides secondary containment if the material is kept in its original container.

VENTILATION

Ventilation is an important and necessary feature of HHW facilities, however the level provided depends on the type of facility and the waste management activities. In some instances, the natural flow of air is sufficient if the facility is somehow open to natural ventilation. Another form of passive ventilation that may be suitable in cases of smaller facilities is providing turbines that are activated by the wind. In enclosed facilities, especially larger ones, some level of active ventilation and exhaust is usually provided throughout the building. If certain wastes are to be consolidated as part of facility operations, such as paint or solvent bulking, additional localized ventilation may also be necessary.

CONSTRUCTION MATERIAL

Facilities currently in operation are constructed of concrete block, metal and even wood. Facilities close to other buildings should probably be made of fire resistant material such as metal or concrete.

FIRE SUPPRESSION

At a minimum, all facilities should have a hand held fire extinguisher available to use against small fires. Automatic dry chemical or foam extinguishing systems are also provided in some facilities. Automatic water systems could spread a flammable liquid fire.

ELECTRICAL

Although the fire code calls for explosion or spark proof wiring to be provided in flammable liquid storage areas, many program operators feel this is excessive in HHW facilities. Grounding of flammable liquid drums is a safety precaution that some facilities include.

PERMANENT FACILITY STANDARDS

SECONDARY CONTAINMENT
IMPERMEABLE SURFACE
SEGREGATION OF INCOMPATIBLES
VENTILATION
CONSTRUCTION MATERIALS
SAFETY EQUIPMENT
FIRE SUPPRESSION
SIZE/LAYOUT
LIGHTING/HEAT/ELECTRICAL

CURRENT GUIDELINES

UNIFORM FIRE CODE
RCRA
OSHA
STATE

SEGREGATION OF INCOMPATIBLES

SEPARATE BAYS
WALLS
CURBING
DRUMS

CONSTRUCTION MATERIAL

CONCRETE
METAL
WOOD

SAFETY EQUIPMENT

EYEWASH
SPILL CONTROL
FIRST AIT
PPE

MPERMEABLE SURFACE

CONCRETE
EPOXY COATED
OTHER

FIRE SUPPRESSION

AUTOMATIC CHEMICAL/FOAM
MANUAL
NONE

VENTILATION

ACTIVE
PASSIVE

SIZE / LAYOUT

RECEIVING AREA
SORT/PACK AREA
STORAGE AREA
DISTANCE FROM OTHER BLDGS

SECONDARY CONTAINMENT

CURBED AREA
FALSE FLOOR

WORK AREAS

RECEIVING
SORTING
PACKING
STORAGE

ELECTRICAL

EXPLOSION/SPARK PROOF
LIGHTING
HEAT

STATE PERMANENT FACILITY PERMITTING REQUIREMENTS

Sharon A. Rehder

New York State Department of Environmental Conservation

The methods used to permit permanent household hazardous waste (HHW) collection and storage facilities vary widely from state to state. To date, the U.S. Environmental Protection Agency has not issued any regulations or guidelines on this issue and has provided very little guidance to states, except to say that HHW, even when accumulated through one of these programs, is unconditionally exempt from regulation as a hazardous waste. The EPA does not require hazardous waste or solid waste permits for these facilities.

Therefore, each state may develop its own regulations or requirements for permitting permanent HHW facilities. The permitting policies of twenty-two states are summarized in the attached Figure. Each state's policies differ from the others in one way or another. Many states, particularly those who do not have any operating permanent facilities, have not yet developed a firm policy on how these facilities will be regulated, and some of those who have had established policies are implementing changes.

The first step that any community which is planning to establish a permanent HHW collection program should take is to call the state agency responsible for regulating this activity. The collection program sponsor should obtain copies of any regulations, guidelines, or application forms which have been developed to regulate this type of program. The sponsor should also find out whether the collected waste is legally hazardous waste or solid waste, whether a permit must be issued, application timetables, and the state contact person responsible for the program. Many states do not have firm written guidelines and may be flexible on approval criteria. If the state has no guidelines or regulations, it may be willing to work closely with the program sponsor to develop its policy. This contact is vital to successful application approval. New York State, for example, strongly encourages program sponsors to meet with the appropriate Department of Environmental Conservation (New York's regulatory agency) personnel early in their planning to discuss application requirements. Timetables for action on permit applications vary widely, according to state law. Solid waste permits may undergo a joint review between the state's hazardous waste and solid waste personnel.

An organization planning to operate a permanent facility must ask the appropriate state agency four questions. First, the sponsor must find out whether collected HHW is legally considered solid waste or hazardous waste. If the waste is a hazardous waste, then state hazardous waste regulations, which by law must

be at least as stringent as those based on the federal Resource Conservation and Recovery Act (RCRA), apply. RCRA has very strict permitting standards which must be met. Most states, however, consider the waste to be a solid waste, and these solid waste regulations provide much more flexibility. Many states which regulate these facilities as solid waste facilities, however, impose some of the strict RCRA standards as permit conditions.

Second, if the sponsor wants to accept waste from organizations other than households, such as small businesses, schools, or farms, it must ask whether the state imposes stricter standards on facilities which accept conditionally exempt small quantity generator (CESQG) wastes. The EPA defines this category of generator as one who generates less than one kilogram of acute hazardous waste and 100 kilograms of all other hazardous waste each month, and stores less than one kilogram of acute hazardous waste and 1000 kilograms of other hazardous waste on site. Regulations governing waste from CESQG's, called simply small quantity generators in some states, vary since some states have chosen to be more stringent than the USEPA regulations. Roughly half of the states allow HHW collection programs to accept waste from these generators. A permanent HHW facility may not accept waste from larger generators of hazardous waste without a hazardous waste permit.

Third, the program sponsor must determine whether a permit is required in that state. Most states require permanent facility operators to apply for a solid waste permit, but some states do not require any permit. Massachusetts, for example, classifies sponsors as hazardous waste generators. Some states may tie the facility into the permit of an existing solid waste facility (such as a landfill or recycling center) to avoid writing an additional permit. If grant money is received from the state, than the state may use the grant application as an opportunity to require information about the facility. In some states, separate permits are required for facility construction and facility operation.

If a permit is required, the legal classification of the HHW as a hazardous waste or a solid waste will determine the type of permit. While RCRA hazardous waste regulations are fairly stringent, most state solid waste regulations allow flexibility. States which issue solid waste permits for these facilities develop their own rules, and therefore are often able to modify the rules to meet local needs. Most commonly, states issuing solid waste permits impose many of the same conditions on these facilities that they do on hazardous waste facilities. These rules have frequently been applied in a piecemeal fashion.

Finally, in states where permits are required, the specific requirements may be contained in regulations or guidelines, and will likely include a combination of the following: an application form(s), an operation plan, a contingency plan,

training requirements, and site layout plans. These plans become part of the permit by reference and contain detailed information on how the facility will be run. The operation plan should include details on the facility design, hours of operation, types of waste accepted, packaging procedures, waste logging forms, personnel requirements, site layout, storage requirements, an inspection schedule, procedures for handling unknowns, and waste transportation and disposal methods. Most states limit storage to ninety days, but the volume that may be stored will vary with the capacity of the building.

The contingency plan is a document which outlines how accidents and emergencies will be handled. The plan should cover, at a minimum, spills, fires, explosions, and personal injuries. For each type of incident, arrangements must be made with local police and fire departments, haz-mat squads, ambulance services, bomb squads, and hospitals, as necessary. These arrangements, along with a complete list of emergency phone numbers, become part of the contingency plan. The plan should also include spill prevention measures, a description of any secondary containment, and methods used to keep incompatible wastes separate.

Many states require that the permit application demonstrate that program workers will be properly trained. OSHA regulations apply to hazardous waste sites and HHW programs are exempt if the state classifies these wastes as solid waste. However, most states still require 40 hours of OSHA approved hazardous waste and emergency response training. Additional program-specific training, including instruction on proper lab packing techniques, will also be necessary. This training is often provided by the hazardous waste contractor. The permit application should provide a list of site staff with their training and qualifications.

Detailed site plans and area maps are usually required. Often, they must be stamped by a professional engineer licensed to practice in the sponsor's state. Some states may also require the sponsor to submit an annual or biennial report, facility closure plans, and site security plans.

Permanent facility sponsors should also check with local authorities early in their planning, since local building, fire, or zoning codes may impose additional requirements on the siting or operation of the facility. Sponsors should contact these officials early during their planning to avoid delaying the facility opening.

STATE	IS THE WASTE HAZARDOUS OR SOLID?	DOES THE FACILITY NEED A PERMIT?	CAN IT ACCEPT WASTE FROM CESQG'S?*	DOES THE STATE HAVE GUIDELINES OR REGULATIONS?
Alabama	SW	No	No	None
Alaska	SW	No	Yes	Regulations
Arizona	SW	No	No	None
California	HW	Yes, HW	Yes	Developing regulations
Colorado	SW	No	Yes	None
Connecticut	SW	Yes, SW	No	Developing guidelines
Florida	SW	No	Yes	Both
Iowa	SW	Yes, probably SW	Yes	None
Kansas	SW	Yes, SW	No	Guidelines, developing regulations
Maine	SW	Yes, SW	Undecided	None
Maryland	SW	Yes, SW	No	None
Massachusetts	HW	No, state approval	Yes	Regulations
Michigan	SW	No	No	None
Minnesota	HW	No, state approval	No	Regulations
New Jersey	HW	Yes, HW/SWMP	Yes	None
New York	SW	Yes, SW	Yes	Guidelines
Oregon	SW	Undecided	Undecided	None
Rhode Island	HW	Yes, HW	No	Regulations
Vermont	SW	Yes, SW	Yes	Guidelines
Virginia	SW	Yes, amend existing SW permit	No	None
Washington	SW	Yes, SW	Yes	Developing regulations
Wisconsin	HW	No, license	No	Fact sheets

* CESQG is a conditionally exempt small quantity generator, defined by the USEPA as someone who generates less than 1 kilogram of acute hazardous waste or 100 kilograms of non-acute hazardous waste each month, and stores less 1000 kilograms on site. State definitions vary.

SW: Solid waste
HW: Hazardous waste

STATE PERMANENT FACILITY PERMITTING REQUIREMENTS

How To Manage Waste Efficiently at Permanent Facilities

Diane Christensen

BACKGROUND:

Our program began in 1985 collecting household hazardous waste at 2 permanent sites, one in the City of San Bernardino and one in Fontana in addition to two, one-day collections. Since that time we have grown to 1 central Part B permitted facility, 6 satellite facilities and 16 annual one day collections. We have found that there are many advantages to managing household hazardous waste through permitted permanent sites.

1. Storage time allows more opportunities for recycling and for price breaks in terms of costs for larger disposal loads.

2. Simple treatment, such as paint consolidation for recycling or fuels blending, can be done.

3. Waste exchange programs can be implemented due to permanent storage facilities.

When preparing for waste management at a permanent facility, one needs to consider while planning:

1. What types of waste does this community generate and in what quantities?
   This answer may be found through community surveys, through one day collection or through a waste stream analysis. In San Bernardino county various regions differ. The desert area generates more used oil; the mountain are more paint etc.

2. Consider how much storage room the program will need depending on how often disposal or recycling pickups will be made. Allow the program some additional storage room for growth. At this time, you will need to decide how to manage the various waste streams to be collected according to which permitted treatment, storage or disposal facilities (TSDF's) are near by, what type of recycling or disposal methods are chosen and what you can afford in your budget. Your hazardous waste contractor may help with these decisions.

3. Will special equipment be needed to accommodate large waste steams (such as a tank for used oil collection)?

4. How can the program follow the waste management hierarchy of source reduction, waste reuse, waste recycling and lastly treatment or disposal? In San Bernardino source reduction is approached through public education including a list of safer alternatives to using household hazardous materials. Waste reuse is accomplished through an informal diversion concept. If someone can use the product for its intended purpose, the product can be taken home after signing it out on our "diversion log".

In addition to individual use, sometimes local companies are invited to use products in larger quantities for their intended purpose. For example, calcium carbide, a water reactive material, has been given to a welding gas supplier/packager to be used in the generation of acetylene gas. These instances of reuse are also documented. Waste recycling can be done with used oil, latex, and in some areas, oil base paints, elemental mercury, lead-acid batteries, gasoline, antifreeze and empty drums. Finally treatment and disposal options are used while managing poisons and pesticides, corrosives (acids and bases), PCB contaminated paint, oxidizers and flammable wastes. Treatment options include but are not limited to incineration, neutralization, stabilization and solidification. Landfilling is the last and least desirable disposal option.

5. What contingencies are in place if a participant brings in explosive, reactive, radioactive or infectious waste? Having prior agreements with local law enforcement, military or fire department bomb squads is essential to the start up of any HHW collection program whether permanent or periodic. Planning for the management of these dangerous and unsolicited wastes will eliminate scrambling for help if these are brought to the facility. Planning includes having the names and phone numbers of local hospitals or infectious waste treatment facilities willing to accept infectious waste from the public. Direct referral of the participant to the treatment facility or hospital may be one option. Radioactive wastes may be handled by agreement with a local university or hospital which may already have a radiologic waste disposal program in place. Reactive waste can usually be handled through a licensed hazardous waste TSDF. Your contractor should have information regarding the proper handling and disposal of these.

6. How will unknown or unidentifiable waste products be categorized? Our program uses a "thumbprint" approach to "hazcat" analysis. We run tests for flammability, oxidizer, water reactivity, pH, cyanides and sulfides in order to determine compatibility of unknown wastes with those it will ultimately be packed with. Some household hazardous waste programs, such as San Francisco's have developed extensive haz cat analysis flow charts to help them categorize their wastes. Your contractor may have knowledge of specific requirements for unknowns' handling depending on the TSDF you will be shipping to.

7. Will this facility be accepting business waste? If the answer in no, planning for referral of these generators to licensed hazardous waste contractors and/or local enforcement agencies is necessary as well as having an educational program to inform them of their responsibilities under the law for proper hazardous waste management. If the answer is yes, you need to plan for permits, segregated storage from household hazardous waste storage areas, hazard categorization of unknowns, a means for tracking what came in from whom and many other issues including liability.

Planning is the key to safe and successful waste management at a permanent facility. Hopefully through source reduction, education and increased opportunities for reuse and recycling we can all work our way out of business.

HOUSEHOLD HAZARDOUS WASTES IN MUNICIPAL WASTEWATERS AND STORM DRAINS

By

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While the improper disposal of household hazardous wastes (hereinafter HHW) is generally thought of as a solid waste problem, many hazardous chemicals from consumer products end up being poured down the drain. Households are thus a potentially significant source of hazardous chemicals in the liquid wastestream, both through everyday use of consumer products and through direct disposal of unwanted or waste products. The liquid wastestream is a potentially significant avenue for the current disposal of HHW, and should not be ignored as such by local or state HHW management programs.

For purposes of this discussion, the liquid wastestream can be divided into three types: on-site wastewater treatment systems (septic tanks and drainfields), municipal sewerage systems which collect wastewaters for treatment at central plants or lagoons, and storm drainage systems which collect stormwater runoff and which occasionally receive other wastes washed or directly dumped in.

Characteristics of Domestic Wastewaters. Back in the good old days, domestic sewage was human waste. Wash and bath waters were handled separately, one bucket at a time. Cleaning was done with soap and elbow grease. The advent of indoor plumbing changed all that, producing both dramatic improvements in public health and large quantities of contaminated water needing treatment. Since the 1940's progressively more complex consumer products have added a toxic twist to the waste that we are just now coming to understand.

Domestic wastewater in America today is a combination of sewage, graywater from laundry and bath, food remains from the garbage disposal and waste from repairs and hobby activities put down the utility sink. Average American water use is between 60 and 85 gallons per person per day; indoor use averages 40 to 60 gallons per day. Toilet, laundry and bath, combined, account for over 75 percent of this indoor water use and thus of domestic wastewater production.

Domestic wastewater consists of 99.9 percent water by weight and only 0.02 to 0.03 percent suspended solids, plus even less of other constituents (Miller, 1980). That doesn't mean that sewage is squeeky clean. It does mean that relatively small concentrations of things (e.g., at the part per million or part per billion levels) can be quite significant in the liquid wastestream.

HHW in Domestic Wastewater. A number of consumer products contain hazardous chemicals, which end up in domestic wastewater through their normal use or through direct disposal of unwanted or waste amounts down the drain. A number of studies in the late 1970's and 1980's have confirmed the presence of heavy metals and toxic organic chemicals in residential wastewaters (see, for example, Levins et al., 1979; Gurnham et al., 1979; Seraydarian et al., 1980; Hathaway, 1980; U.S. EPA, 1982; Galvin et al., 1984; Cooley et al., 1984; U.S. EPA, 1986).

All of the important trace elements called heavy metals are found in residential wastewaters. Table 1 contains representative concentrations. Some are from foods and others from water supply or domestic plumbing. Consumer products do contain numerous heavy metals, often in substantial concentrations, and do contribute to the heavy metal load in domestic wastewaters as confirmed in the classic National Science Foundation Study by Gurnham et al. (1979). The per capita contributions of metals from a variety of cleaners and cosmetics are shown in Table 2. Significant metal contributors to domestic wastewaters include soaps and detergents, paint products, cosmetics, some cleaners and hobby supplies.

Many hazardous organic chemicals are also found in residential wastewaters. These include solvents, paint thinners and degreasers such as tri- and tetrachloroethylene, methylene chloride, benzene and toluene, pesticides such as DDT and lindane, incomplete combustion products called PAH's and plastic components known as phthalates, among others. Table 3 contains representative values.

Periodic dumping of HHW items results in occasional high concentrations of hazardous chemicals in the sewers over and above the routine levels noted above -- what the engineers call "slugs" in the pipes. Examples from residential areas include gasoline (with resultant explosions), used motor oil, pesticides and PCB's, mercury from thermometers, acids and bases from drain cleaners, solvents from degreasers, copper from invasive root killers, and unique chemicals from hobby supplies.

On-Site Systems. Septic tank/drainfield systems, cesspools and other on-site wastewater treatment mechanisms are "alternative"

Table 1. **Heavy Metals in Domestic Wastewater.** Mean values are shown from three studies, in parts per billion or micrograms per liter.

Element	Chicago (Gurnham et al., 1979)	Seattle (Cooley et al., 1984)	EPA 4-cities study[a] (Levins et al., 1979)
Antimony	N/A[b]	2.1	2.7
Arsenic	N/A	2.9	4.8
Cadmium	1.8	1.4	1.8
Chromium	5.5	12.0	16.3
Copper	43.0	72.0	72.0
Lead	17.0	91.0	97.0
Mercury	0.3	0.4	0.4
Nickel	20.0	22.0	4.2
Silver	N/A	1.7	2.2
Zinc	107.0	150.0	214.0

[a]Cincinnati, St. Louis, Atlanta and Hartford.

[b]N/A = not analyzed for in this study.

Table 2. **Heavy Metal Contributions from Household Products likely to enter Domestic Wastewater.** Values are given in micrograms per capita per day, from Gurnham et al. (1979).

	Metal Contribution						
	Cd	Cr	Cu	Pb	Hg	Ni	Zn
Mouthwash	0.3	2.1	1.7	1.2	0	69.9	2.9
Toothpaste	4.2	11.3	26.4	29.3	0.1	326.8	17.3
Toilet Tissue	4.5	21.9	3.8	23.9	0.6	108	31.3
Bath Soap	18.3	267	104.7	147.2	6.3	4404.3	117.9
Waterless Hand Soap	0	0.1	0	0.1	0	0.5	0.2
Shampoo	0.2	4.0	1.3	0.6	0	32.1	44.9
Creme Rinse	0.11	1.8	1.0	0.5	0	15.9	1.2
Baby & Bath Oil	0.4	6.5	2.3	0.6	0	80	7.8
Skin Lotion	0.4	5.7	1.2	0.7	0	86.8	6.2
Acne Lotion	0	0	0	0	0	0.36	0
Shave Creme	0.1	1.8	0.7	0.2	0.1	18.7	1.2
Pre-shave Lotion	0	0.1	0	0.1	0	0.6	0.5
Depilatory Creme	0.1	0.1	0.1	0.4	0	1.2	0.2
Liquid Dish Detergent	4.5	22.2	32.8	2.0	0	536.6	5.6
Dishwasher Detergent	1.3	13.1	7.3	2.8	0	2363.7	12.8
Powder Kitchen Cleaner	0.6	11.9	13.4	3.0	0	1491.7	312
Steelwool Soap Pads	1.0	1.1	5.2	0.1	0.1	15	0.8
Toilet Bowl Cleaner	0.3	6.3	4.5	0.9	0	283.9	30.8
Drain Opener	0.1	0.8	0.1	0	0	10.1	0
Liquid Laundry Soap	2.3	7.9	6.6	2.7	0	97.6	14.6
Powder Laundry Soap	26.6	221.9	249.4	31.3	0.3	11523.6	94.5
Fabric Softener	7.4	10.1	9.3	24.9	0	95.8	4.3
Liquid Cold Water Wash	0	0.1	0	0.01	0	0.5	0.1
Liquid Bleach	3.6	10.7	5	2.0	0	519.6	8.1
Powder Bleach	2.5	22.7	24.3	1.5	0	1162	11.2
Liquid Household Cleaner	1.7	7.6	3.4	2.1	0	92.4	10
Household Powder Cleaner	0.7	3.2	3.2	0.1	0	104.6	1.8
Liquid Dye	0	0.3	2.3	0	0	6.7	0.4
TOTALS	81	662	510	272	7.5	23449	738

Table 3. **Organic Chemicals in Domestic Wastewater.** Mean values are shown from two studies in parts per billion or micrograms per liter.

Compound	Seattle (Cooley et al., 1984)	EPA 4-cities study[a] (Levins et al., 1979)
Phenol	14.8	5.8
Naphthalene	3.8	2.1
Phenanthrene	0.9	NR[b]
Diethyl phthalate	10.4	9.8
Di-n-butyl phthalate	34.5	9.0
Butyl benzyl phthalate	36.4	6.8
Di-octyl phthalate[c]	20.4	6.8
Methylene chloride	77.8	NV[d]
Chloroform	4.2	3.0
Trichloroethylene	4.3	0.4
Tetrachloroethylene	125.0	6.3
Benzene	5.0	0.2
Ethyl benzene	1.0	0.4
Toluene	3.1	2.6

(a) Cincinnati, St. Louis, Atlanta and Hartford

(b) NR = detected but mean not reported because of low detection frequency.

(c) Includes bis (2-ethylhexyl) phthalate.

(d) NV = no value reported because of unreliability of analyses.

disposal systems for wastewater generally used in rural, low density areas -- ironically, the same areas that tend to rely on individual wells for drinking water. On-site systems provide initial treatment of domestic wastes before they are further purified by the filtering action of the soil.

Approximately one-third of all U.S. housing units dispose of wastewater with a septic tank or other on-site system, and about 25 percent of new homes being constructed rely on these systems (Canter and Knox, 1985). Use of septic tanks is predominately located in the Northeast, but significant concentrations are also found in Florida and the West Coast. The four counties with the greatest density of on-site systems are Nassau and Sulfolk on Long Island, New York, Dade in Florida and Los Angeles in California.

A U.S. EPA (1984) study concluded that "...only forty percent of existing septic tank systems function properly" and that "...of all groundwater pollution sources, septic tank systems and cesspools rank highest in total volume of wastewater discharged directly to soils overlying groundwater and they are the most frequently reported sources of contamination."

Of the hazardous chemicals found in domestic wastewaters, the light weight or volatile organic solvents present probably the worst problem with septic tanks. Degreasers, cleaning fluids, paint thinners, deodorants and many other products contain such organics as tetrachloroethylene, tricholoroethylene, toluene, carbon tetrachloride, benzenes, xylenes, naphthalenes and phenyl-phenols. These solvents go right through on-site systems and adjacent soils and have the greatest likelihood of reaching nearby groundwater.

The most notorious hazardous chemical problem with septic tanks has resulted from the use of drainfield degreasing agents, particularly tetra- or perchloroethylene (commonly called "perc"). It has now been banned from use in a number of areas. A Connecticut study (Kolega et al., 1982) found toluene and other organics in 19 of 21 domestic septage truck loads and in a majority of down-gradient wells from septage leaching pits, sometimes at concentrations greater than 1,000 ppb. DeWalle et al. (1982) found toluene, methylene chloride, tetrachloroethylene and ethylbenzene in domestic septic tank effluent, often with higher concentrations on weekends; they concluded that there was "essentially no removal" of these organics in the septic tank (i.e., they passed right through the system untreated). Similar results were found by Laak (1986) and Morton (1982).

Heavy metals may also pose problems, although they tend to bind more readily onto septage and soil particles. Canter and Knox (1985) note that "metals in the effluents from septic

tank systems may be responsible for contamination of shallow water supply sources." They reference a study from Chesterfield County, South Carolina, that showed "metallic contamination" from septic tanks: arsenic, iron, lead, mercury and manganese were higher in adjacent groundwaters than recommended limits. Kolega et al. (1982) also found heavy metal problems in groundwaters down-gradient from septage lagoons; lead and zinc levels exceeded Connecticut potable water standards.

On-site sewage treatment systems are not designed to treat hazardous chemicals and may represent the most significant problem area for household hazardous wastes in wastewaters. Many chemicals can pass right through a septic tank and drainfield, others may kill or drastically retard the bacterial breakdown of human wastes in these systems. Hazardous chemicals have no place being put down the drain into on-site systems.

Municipal Sewerage Systems: Publicly owned wastewater treatment systems collect residential, commercial and, in many areas, industrial wastewaters in a network of sewers for treatment at a central facility. There the wastewater is screened, treated in a primary system (gravity settling and skimming), followed in most places by a secondary system (bacterial decomposition), and in some sensitive locales, by a tertiary or advanced system (often a chemical process to remove excess nutrients); finally the treated effluent is disinfected to kill remaining microorganisms before being discharged into the ground or to a river, lake, estuary or ocean. The material that is left over, sludge, is usually further treated by bacterial digestion and reused in land application or disposed via incineration or ocean dumping.

All studies that have looked at the contribution by residential sources of hazardous constituents have shown that domestic sources do contribute both heavy metals and toxic organic chemicals to treatment facilities. The U.S. EPA's (1986) "domestic sewage study" found residential sources to be a "small but significant" source of the total hazardous constituent loadings to municipal treatment plants nationwide. Average national residential contribution to municipal treatment plant influent for total organic chemical priority pollutants was 7.5 percent, and for total hazardous metals was 19.4 percent. These relative contributions were predicted to increase dramatically as industrial sources came under stricter pretreatment regulations.

Gurnham et al. (1979) found domestic sewage to be a "significant source of heavy metals" to Chicago's municipal system. The National Science Foundation team "...found domestic sources too significant to be ignored in any policy or program dealing with heavy metal control" (AMSA, 1979).

Seattle Metro's wastewater studies (Galvin et al., 1984; Cooley et al., 1984) also concluded that non-industrial sources, including residential areas, contribute substantially to total treatment plant loadings for both metals and organics. Because the contribution of wastewater flow from residential sources is large compared to the total flows from industrial and commercial sources, the mass of toxicants from all the small, individual residential sources combined can represent a major portion of the total loadings received at wastewater treatment plants (Gall and Houck, 1984). Residential contribution of heavy metals and organic chemicals to Seattle Metro's two large treatment plants are shown in Tables 4 and 5 respectively.

While some chemicals are broken down in municipal treatment plants (U.S. EPA, 1986), many are "treated" (i.e., removed from the wastewater) either by aeration or settling. Most of the volatile organic compounds such as the solvents are stripped out of the wastewater and put into the air. Heavy metals, phthalates, pesticides and PCB's tend to settle out with the solid particles in the sludge.

The introduction of non-sewage chemicals into the municipal wastewater treatment system can present problems, both directly to human or environmental health as well as to treatment system operations and management. While it is highly unlikely that household contributions to the sanitary sewer would cause an upset of the bacterial precesses at a treatment plant because of the sheer dilution volumes in the sewerage systems, the number of residences add up to a significant total load of many hazardous chemicals into the treatment plants. It is this cumulative effect of many small sources that adds up to a significant issue for municipal systems.

Individual effects are possible, however, such as from small amounts of gasoline exploding in the sewers. A single pint jar of mercury, accumulated over many years from broken thermometers and other sources, was turned in at an HHW collection event in Seattle. If that seemingly small amount of pure mercury had been dumped down the drain, it could have caused a violation of Metro's effluent discharge limits at its 125 million-gallon-per-day treatment plant and contaminated a significant volume of sludge.

Seattle Metro's HHW policy is one of responsible management at the source. We feel that the most cost-effective way to control hazardous chemicals is to not allow them to get into the wastewater or environment in the first place.

Stormwater Drainage Systems. Storm drains in most areas collect stormwater runoff from streets and parking lots and convey it to the nearest body of water (which, in some areas, is the groundwater via recharge basins). Very few storm drainage systems employ any treatment of the stormwater; they are separate from the sanitary sewers. Whatever goes down a catch basin or storm drain goes untreated into local waters.

Table 4. **Residential Contribution of Commonly Detected Metals to Seattle Metro's Wastewater Treatment Plants.** Data are in pounds per day and percentage of the total mass loading into each plant. Loadings are calculated from data presented in Cooley et al. (1984).

Compound	Residential Load				Uses and Products
	Renton Treatment Plant		West Point Treatment Plant		
	lb./day	Percent	lb./day	Percent	
Antimony	.17	37	1.3	22	Flame retardant, dyes, inks fireworks, matches
Arsenic	.62	36	1.2	30	Fungicides, wood preservative:
Cadmium	.71	26	1.3	17	Paint pigments, cigarettes Pvc plastics, dyes, shampoos pesticides
Chromium	.76	2.5	3.1	2.4	Powder laundry soap, bath soa; dyes, shampoos, pesticides
Copper	25	36	50	26	Powder laundry soap, shampoos kitchen cleaners
Lead	14	34	40	23	Paint products, cosmetics
Mercury	.13	53	.27	41	Paint pigments, thermometers photographic products, cosmetics
Nickel	10	51	28	40	Bath soap, powder laundr; soap, powder bleach, kitche: cleaners, dishwasher deter- gent dyes, shampoos
Silver	.40	9	1.1	8	Batteries, pesticides, photo- graphic products
Zinc	35	41	150	41	Bath soap, powder kitcher cleaner, deodorant, pesti- cides, shampoos, cosmetics, polish

Table 5. **Residental Contribution of Commonly Detected Organic Chemicals to Seattle Metro's Wastewater Treatment Plants.** Data are in both pounds per day and percentage of the total mass loading into each plant, from Gall and Houck (1984).

Compound	Residential load				Uses and products
	Renton		West Point		
	lb/day	Percent	lb/day	Percent	
Phenol	6.4	56	15	47	Disinfectants, antiseptics, medical ointments, perfumes, glues.
Naphthalene	4.3	75	10	68	Pesticides, insecticides, bathroom deodorants, detergents, upholstery and rug cleaners.
Di-ethyl phthalahthalate	3.6	83	8.1	83	Food packaging, perfumes, insect repellants, glues, cosmetics, polishes.
Di-n-butyl phthalate	14.8	69	33.8	64	Lubricants, insect repellants, cosmetics, fragrances, gasoline, plasticizers.
Butyl benzyl phthalate	13	68	30	59	Lubricants, insect repellants, cosmetics, fragrances, gasoline, plasticizers.
Di-octyl phthalate	0.2	9	0.5	3	Lubricants, insect repellants, cosmetics, fragrances, gasoline, plasticizers.
Methylene chloride	8	66	18.6	59	Oven cleaners, tar removers, waxes, spray deodorant, brush cleaners.
Chloroform [a]	1	45	2.3	44	Liniments, degreaser, medicines, water supply.
Trichloro-ethylene	3.4	38	7.9	30	Upholstery cleaners, degreasers, waxes, tar removers.
Tetrachloro-ethylene	9.4	88	21.7	84	Contact cements, degreasers, wax removers, shoe dyes and polishes, upholstery and rug cleaners, garden pesticides, home and auto parts cleaners.
Benzene	1.2	66	2.8	63	Adhesives, antiperspirants, deodorants, oven cleaners, tar removers, medicines, solvents and thinners.
Ethylbenzene	1.0	24	2.3	19	Petroleum products.
Toluene	1.0	29	2.3	29	Contact cements, detergents, paint brush cleaners, perfumes, degreasers, shampoo.

(a) Includes source from water supply chlorination.

Yet most people are either not aware of this or choose not to think about it: the out-of-sight-out-of-mind mentality. As a result, all kinds of things end up dumped down storm drains that shouldn't be. Most common are used motor oil, antifreeze, gasoline, car washwater, acid masonry washes, paints and pesticides. In addition, stormwater runoff picks up fertilizers, herbicides and insecticides washed off lawns and gardens; moss killer and wood preservatives from roofs, buildings, decks and fence posts; and the products of normal automobile traffic, such as lead, zinc, oil and PAH's, from streets and driveways (Galvin and Moore, 1982; U.S. EPA, 1983; Hoffman et al.,1980).

Storm drains have exploded as a result of gasoline dumping. Used motor oil from do-it-yourselfers frequently contaminates local waters. One quart of motor oil spreads out over a surface of water larger than a football field. All fish kills that have occurred in recent years in the Seattle metropolitan area appear to have been the result of direct dumping of a hazardous substance rather than from routine stormwater runoff (Galvin, 1987).

Basically all chemicals in HHW are of concern in storm drains because of their immediate release into the local environment. No wastes should be dumped into drainage systems.

Summary: Hazardous chemicals are found in domestic wastewaters, coming from hazardous product use, HHW disposal and other sources. Septic tanks and storm drains are particularly sensitive systems because many of the HHW constituents pass right through into the environment untreated. HHW represents a "small but significant" source of hazardous chemicals to municipal sewerage systems. A policy of responsible management of all of these wastewater systems would minimize the entry of HHW down the drain, to keep the liquid waste treatment processes as uncontaminated as possible and, ultimately, to keep our waters as clean as possible.

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COLLECTING HOUSEHOLD HAZARDOUS WASTE AT WASTEWATER TREATMENT PLANTS

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Environmental Protection Agency's Office of Municipal Pollution Control (OMPC) is encouraging the use of wastewater treatment plants (WWTPs) as collection points for Household Hazardous Wastes (HHW). This concept benefits both hazardous waste management and wastewater management. Many WWTPs have the equipment and trained staff necessary for handling hazardous materials, which makes them ideal candidates for managing HHW collections. At the same time, by helping to prevent the disposal of HHW down sewer drains, the WWTP and receiving stream is protected from the harmful effects of toxic substances.

This paper presents two case studies characterizing HHW collection programs held at WWTPs. The studies are organized to relate details of the program design, administrative organization, program objectives and results to provide plant operators with examples to follow in organizing a HHW collection program at their facility. These and five other case studies presented in the forthcoming USEPA report entitled "Collecting Household Hazardous Wastes at Wastewater Treatment Plants," illustrate several different alternatives for WWTP participation in HHW collection. The report may be used as a supplement to the How-To guide for HHW collection programs, also available from the USEPA.

HHW and the Wastewater Treatment Process

HHW includes any household material that may be corrosive, reactive, ignitable or otherwise damaging to human and environmental health. The average home contains 3-10 gallons of hazardous materials and studies have shown up to 20% is disposed in municipal sewers. The City of Seattle (METRO) conducted a study that revealed homes were the major source of certain hazardous chemicals found in the sewer system. Data collected from WWTPs have shown the presence of 102 priority toxic pollutants in the influent. Samples taken from New York City's WWTPs indicated that domestic wastewater is a major source of bis(2-ethylhexyl) phthalate, tetrachloroethylene, and trichloroethane.[1] These priority pollutants can result from materials that include gasoline, insect repellant, cosmetics, fragrances, shoe polish, waxes, upholstery and rug cleaners. Trace amounts of toxic products discharged by millions of households can amount to significant loadings at the WWT.

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[1] County Sanitation Districts of Orange County, 1985. "Non-Industrial Toxics Source Control Program Feasibility Study and Implementation Plan". Prepared by K.P. Lindstrom & Associates.

Because these loadings are potentially damaging to the treatment process and the plant itself, WWTPs should consider hosting or co-sponsoring a collection program. HHW in sewer systems has caused explosions and has lead to premature corrosion. HHW can also inhibit biological wastewater treatment processes, contaminate sludge and generate toxic fumes causing illness to plant workers. Some HHW can pass through a WWTP untreated, impacting receiving water and its biota, and contaminating drinking water supplies. In Louisville, Kentucky, several accidents have been attributed to improper disposal of HHW, the most notable of which involved injuries to a sanitation worker burned by muriatic acid in the municipal waste stream.

WWTPs that have been involved in HHW cite additional benefits of hosting HHW collection events. The HHW collection event can provide an opportunity for public education about wastewater treatment and enhance the image of the WWTP.

Principal concerns in siting of HHW collection centers are accessibility to emergency spill equipment, distance from water supplies, and potential for facilities to adequately provide for traffic flow. A number of communities have found that wastewater treatment plants (WWTP) provide the necessary spill control measures, water supplies and vehicular accessibility for HHW collection as well as offer convenience to target populations. Use of the treatment plant for one day collection events is also advantageous over the use of other public facilities since the plant is not likely to host other events which would conflict with a collection program (e.g., high school sporting events, social activities). Locating permanent centers at the WWTP also provides continued staffing for screening and storage of HHW.

The case studies presented herein characterize the HHW collection programs held at WWTPs in St. Johns, Michigan and Palo Alto, California. St. Johns provides annual one-day collection events at the WWTP, while Palo Alto, which formerly conducted HHW collection at the recycling center, has recently initiated quarterly HHW collection at the WWTP. Both communities reported enthusiastic public participation. Neither event conflicted with operation of the treatment facility, and each community intends to continue HHW collection at the WWTP.

CASE STUDIES

St. Johns, Michigan

Introduction

Since 1988, the City of St. Johns, Michigan has held two, one-day HHW collection events at the local wastewater treatment plant. Both events were organized to increase public awareness of the wastewater treatment process and the importance of proper disposal of HHW. In addition, the HHW collection events aided the local voluntary recycling program by providing a safe disposal alternative for non-recyclables. It also provided an opportunity for local and regional elected officials to view HHW collection and wastewater treatment processes first hand.

Program Design

Location and Schedule

The following is based on the most recent HHW collection event held at the St. Johns Wastewater Treatment Facility (WTF) on Saturday, June 30, 1990. This event was advertised as part of the city's annual Spring Clean Up. During Spring Clean Up the city provides additional waste collection services to discard items not normally handled by the regular refuse hauler (e.g., bulk items, appliances, furniture, etc.). Throughout the two week Spring Clean Up program, residents were instructed to consolidate HHW and take it to the HHW collection event. Drug and Lab Disposal Inc., a full service HHW collection and disposal contractor was hired to service the event. In addition, the WTF offered a HHW home pick-up service to senior citizens. In the week prior to the collection day senior citizens could call the WTF and arrange for a staff person to pick up HHW. This material was stored at the WTF for disposal by Drug & Lab Disposal, Inc. on the day of the collection event.

The WTF is conveniently located, and is well designed for HHW collection. The driveway is U-shaped and facilitates good vehicular circulation, preventing traffic problems. The public is greeted at the facility gate by a WTF employee who checks identification for proof of St. Johns residency. Traffic moves around behind the facility to the collection site where participants are asked to complete a questionnaire relating to the collection program and proceed to the unloading area. The questionnaire is designed to solicit information relating to the public perception of the HHW collection program. Citizens are encouraged to remain in their cars while materials are unloaded by staff from the WTF and the contracting company. Chemists from the collection company classify the material and prepare it for transport.

The St. Johns WTF, a Class B, tertiary treatment facility, learned about HHW collection from the State of Michigan Waste Management Division (WMD). WMD administers the Clean Michigan Fund to award grant money to municipal governments for the purpose of developing and implementing

HHW collection events. This fund was used for the first HHW collection event in St. Johns (1988); it was not used for the 1990 event since the fund is intended only for program development. Municipalities are charged with maintaining the subsequent collections.

Personnel

The city retained a contractor to sort, store, transport and dispose of HHW collected during the event. WTF staff, however, provided many services including advertising, home pick-up, and organizational and touring responsibilities during the collection event. Advertising and home pick-up involved approximately two employees, part-time, over a three week period prior to the collection event. During the event three WTF employees were needed to direct traffic, check I.D.'s for residence verification, administer questionnaires, and help the contractor to unload HHW from the vehicles. Several other employees were available to give facility tours and answer questions about the facility.

Emergency staff (e.g., police, fire department) are not at the WTF during collection events. However, the local hospital is near the WTF and the fire department is informed of the event.

Contractor

Drug and Lab Disposal, Inc. was hired to complete the collection events that have been held in St. Johns. Rather than using a competitive bid process, the municipality researched local HHW collection contractors and made their decision based on the HHW collection experiences of other municipalities in the area. Drug & Lab Disposal, Inc. is fully equipped and licensed to haul special industrial and hazardous waste. They operate a certified Toxic Substances Disposal Facility (TSDF) and can therefore expedite the packing process and re-sort materials at their facility.

Administrative Organization

Funding

Costs involved for St. John's HHW collection events include the contractor's services, advertising such as posters, mailings, and press releases, and internal costs for staff on the collection day and days preceding the event for home pick-up for senior citizens.

Internal costs to the municipality for publicity and labor are difficult to quantify, however they are estimated at approximately $2,500. The budget for contracted services for the first event was set for between $6,000 and $9,000. The actual cost of the hauler's services was $7,800. For the second event, a not-to-exceed $10,000 budget was negotiated with the contractor. The actual value of contractor services at the second event was $28,379; St. Johns, however, was only charged $10,000 because of the not-to-exceed price ceiling. The high cost of the collection was attributed to the large turn-out resulting from coordinating the collection event with the city Spring Clean Up. The municipality anticipates that the costs for future collection events will be significantly greater because the contractor is now

aware of the quantity of HHW that will be collected and will be more conservative in future budget negotiations.

Publicity

The collection event was advertised using direct mailings, newspaper articles, and notices on bulletin boards in grocery stores and laundromats. HHW brochures from the Water Pollution Control Federation were also mailed to residents along with a detailed notice of the event. The notice stressed that the collection event was free and was provided as a means for residents to recognize the hazardous materials in their households, and conveniently dispose of them. In addition, the notice advised senior citizens that door-to-door collection was available at their request.

Regulatory /Liability Requirements

The State of Michigan does not require municipalities to purchase additional insurance or obtain special permits for HHW collection. However, the waste hauler is required to be fully licensed and insured for collection, transportation, and hauling of hazardous materials.

Results

The results of the June 1990 St. Johns HHW collection event are as follows:

Contractor:	Drug and Lab Disposal
Participation:	452 vehicles

Waste Collected

Unknown Aerosols	452 cans
Oil based Paints	915 gallons
Automobile Batteries	3,902 lbs.
Pesticides	21 gallons
Liquid Solvents	400 gallons
Asbestos	4 cu. ft.

The event was considered successful on the basis of public participation and positive feedback from the community. The event drew approximately 452 participants from a population of approximately 7,800. This is a high level of participation compared to the turn-out observed at similar one-day collection events held elsewhere in the United States (1% to 2% on average). Municipal staff attribute the success to the coordination of the event with the City's annual Spring Clean Up.

The Citizens of St. Johns were enthusiastic about the collection event and indicated on questionnaires a willingness to pay a greater fee for the service. The WTF received numerous telephone calls after the event from individuals who had missed the opportunity and still wanted to dispose of HHW. The county government is therefore planning a HHW collection event for the near future and is seeking assistance from the City of St. Johns in organizing the event.

Problems and Limitations

The main problem with HHW collection in St. Johns is the financial and manpower commitment required for contractor services. As mentioned earlier, the actual value of the most recent collection event far exceeded the municipality's budget and therefore the next collection event is anticipated to be much more costly. To reduce costs, the municipality is considering operating future events using trained staff from the WTF to sort, package and transport the material off site. However, this idea is under preliminary investigation and any decision will require full consideration of all aspects of the tasks required for HHW collection.

Palo Alto, California

Introduction

The Palo Alto Department of Public Works initiated a HHW collection program in 1983 to minimize toxic chemical contamination of municipal wastewater at the Regional Water Quality Control Plant (RWQCP), protect refuse workers from injuries associated with HHW, and prolong the life and protect the environmental integrity of the city landfill. The city has been cited for a violation by the California Integrated Waste Management Board for disposal of unacceptable materials (paint cans and empty flammable material containers) in the landfill. The HHW collection program is designed to reduce the volume of such materials requiring landfill disposal.

Over the last seven years, 26 HHW collection events have been held at the Palo Alto Recycling Center. These events are held on a quarterly basis and have had greater participation in recent years. As a result, the City decided to relocate the collection events to the RWQCP to minimize traffic problems and provide a more organized collection program.

Program Design

Location and Schedule

HHW collections in Palo Alto are held at the RWQCP quarterly, on Saturdays from 10:00 am to 3:00 pm. However, starting in September, 1990, the City began a trial monthly collection program on Saturdays from 9:00 am to 12:00 noon. The Palo Alto Public Works Department sponsors the events. A HHW collection contractor is hired to package and transport and dispose of HHW.

HHW collection events were originally located adjacent to the RWQCP at the Palo Alto Recycling Center, on the grounds of the local landfill. This 2.4 acre site provided adequate space for unloading and sorting materials, however, traffic flow became problematic as attendance at these events increased. Consequently, the City recently moved the HHW collection events to the RWQCP. Unlike the Recycling Center, the RWQCP has a separate entrance and exit, along with ample parking space to allow good traffic flow through the facility. The collection site is situated along the edge of a parking lot. The HHW collection contractor, Safety Specialists, Inc., (SSI) sets up tables and tent areas for sorting and packaging HHW. The contractor also surveys participants to verify city residence, identify first-time attendees and determine the number of households represented by a single carload. All attendees are required to remain in their vehicle while the contracting staff unloads HHW.

Because Palo Alto has had a HHW collection program for so long, the schedule and organization of the events has become somewhat standardized. SSI has always serviced Palo Alto for HHW collection and is familiar with the attendance rates and the city's approach to HHW collection.

Personnel

SSI, the HHW collection contractor, provides complete service for HHW collection events, therefore these events do not involve a large staff of city employees. Most events are staffed by one city employee from the Public Works Department and approximately 24 contracted professionals including 5 people to administer surveys and direct traffic, 15 technicians, 3 chemists and 1 project manager. The city employee is available to answer questions, make any necessary decisions, and oversee the contracted staff.

Contractor

Contractor selection is conducted through a competitive bid process. Every three years the city issues a Request for Proposal (RFP) for the program. The RFP outlines the city's requirements for the contract and specifies the number and qualifications of employees to staff the events, as well as the services (including traffic control, materials handling, site preparation, demobilization and cleanup) that must be provided by the contractor.
SSI has always been awarded the contract for HHW collection. Because SSI is not a full Toxic Substance Disposal Facility, the company must contract with various hazardous waste management facilities to dispose of Palo Alto's HHW appropriately. SSI is fully licensed with the United States Department of Transportation to transport hazardous materials.

SSI attempts to recycle much of the HHW collected at Palo Alto. Motor oil, and reusable solvents are, separately collected for reuse as fuel; automobile batteries are recycled. Nonrecyclable materials are sent either to an incinerator or to a Class I landfill elsewhere in the State of California.

Administrative Organization

Funding

The budget for each event in the 1990-1991 operating year was raised to $55,000 from the 1989-1990 budget of $40,000. Actual costs vary, but the average actual cost per event for 1989-1990 was $50,474. This figure represents only charges for the contractor. Internal costs for program organization and administration are not tracked, however these tasks, because they have been standardized over the years, require less financial commitment than the original program development.

The HHW collection program is funded through the residents' refuse fee set by the Palo Alto City Council. The council is supportive of HHW collection, consistently approving increases in the program budget. The residents are also supportive of the collection program. Survey results from recent collection events indicate that 78% of the attendees surveyed were willing to pay an additional fee of between $5.00 to $20.00 for the service.

Publicity

Because the residents of Palo Alto consistently support regular HHW collection events, publicity for these events is limited to a utility bill insert one month in advance of the event, and a notice in the local newspaper one week in advance. The notices identify HHW and provide an explanation of why it should be taken to the collection event. A directional map for the collection site is also printed on the notice, along with a reference to the state transportation regulations limiting the amount of hazardous materials that may be transported.

Regulatory /Liability Requirements

HHW is not exempt from California regulations governing hazardous waste handling. These regulations require permits for any activity that involves the handling of hazardous waste. Therefore, for HHW collection events, municipalities in California must obtain a letter of approval, or a variance from the permit requirement, from the California Department of Health Services. Permanent facilities that store HHW for up to 90 days are generally not eligible for this variance, and must apply for a full hazardous waste handling permit. California HHW regulations are currently in transition; the Department of Health is moving to a permit-by-rule approach that will allow 7-day storage for one-day events and will require appropriate documentation of plans for emergency response and site operation.

The City of Palo Alto is self-insured, however, the contract with the collection company stipulates that the company maintain a $1,000,000 insurance policy including full workman's compensation, general and comprehensive liability, and sudden or accidental pollution coverage. The contractor must also name the City of Palo Alto as an additional insured party.

Results

Because Palo Alto has sponsored HHW collections for a number of years, they have acquired a large database of information about participation rates, materials collected and costs involved. Table 1 shows results of each collection during the 1989-1990 period which are markedly constant. Of Palo Alto's 65,000 residents, an average of 526 households (approximately 3%) are represented at each event. This level of participation is relatively high for regularly scheduled collections. Table 2 summarizes the survey results and volumes of HHW collected from the April 28, 1990 event held at the RWQCP. Over half of the participants had never attended a HHW collection event and most had learned about it from the utility bill insert. Future events are expected to continue to attract a consistent level of participation. RWQCP managers were attentive to the HHW collection event and its impact on the facility. Although they were not directly involved with this first collection event, the RWQCP managers are working on an education campaign to familiarize the public with wastewater treatment. These collection events provide a forum that could be extremely valuable to this outreach effort.

Problems and Limitations

The biggest problem encountered at events held at the recycling center was traffic control and disruption of the recycling operation. Because the center shares the access road with the local landfill, residents transporting goods to the landfill were inconvenienced by the long lines resulting from HHW collection. Communication became problematic as these individuals were not aware of the reason for the delay.

While these traffic problems were not encountered at the RWQCP, a minor problem was reported for this location. Sensors at the plant used to monitor for chlorine leaks are extremely sensitive and are known to be activated with some frequency. Although these alarms have never indicated a real danger to individuals on site, they can cause concern among the collection participants and staff if they sound during the event. Therefore, precautions must be taken to limit the number of cars entering the facility at any given time to facilitate safe evacuation if it becomes necessary. During an event held on July 28, 1990, the alarm went off. At this time, traffic was halted at the entrance and the problem was rectified, preventing any necessary evacuation or disruption of the collection event.

	July 1989	Oct. 1989	Jan. 1990	Apr. 1990
Participation (No.)				
Vehicles	398	470	423	538
Households represented	463	541*	462	641
Previous participant	175	283	191	233
New Participant	223	187	232	305
Hazardous Waste Collected (No.)				
Drums for disposal	978	253	109	116
Drums for incineration	24	13	16	23
Gallons of latex paint recycled	2,133	180	556	1,262
Vehicle batteries recycled	32	30	36	89
Costs				
Estimated budget	$40,000	40,000	40,000	40,000
Actual expended	$46,675	63,796	43,276	48,148

* Due to heavy rainfall, the survey takers were unable to record full information. The number of households figure is an estimate based on responses from 231 vehicles.

Table 1 Results for Fiscal Year 1989-1990

General Results

Number of Vehicles	538	up from 423 1/20/90
Number of Households	641	up from 462 1/20/90
Previous participants	233	43%
New participants	305	57%

How participants heard of program:

Newspaper ad	118	22%
Utility bill	369	69%
City Offices	18	3%
Word of Mouth	13	2%
Other	32	6%

Council Questions	**Yes**	**No**
Aware program funded by garbage fee	164 - 30%	374 - 70%
Aware of cost to City $100-200 per participant	35 - 6%	503 - 94%
Willingness to pay additional fee*	419 - 78%	119 - 22%
How much		
$5	246 - 59%	
$5-20	156 - 37%	
+$20	17 - 4%	

Hazardous Waste Collected

Drums of hazardous waste packed for disposal	116
Drums of hazardous waste packed for incineration	23
Drums of latex paint recycled	1,262
Auto batteries recycled through City program	89

***Comments regarding additional fee:**

Do not support additional fee - deterrent to proper disposal, already too many fees.

Support of additional fee - support if users fee only, support if based on volume produced.

Table 2 Results of HHW Collection 28 April 1990

HOUSEHOLD HAZARDOUS WASTES IN SEPTIC SYSTEMS
TYPES, QUANTITIES AND IMPACTS

John J. Kolega, Ph.D.[1]

The products used by a household that have potential for making their way into an on-site sewage disposal system can be placed in the following source categories: (1) household; (2) garage/workshop; (3) garden; and (4) other. The fourth category includes miscellaneous products used within the home, i.e., cleaning solvents, photographic chemicals, artist supplies, etc., not addressed by the other groups.

Within the home, the entry way for hazardous household wastes (HHW) into the on-site sewage disposal system, usually a septic tank-soil leach system, is through the kitchen or bathroom plumbing drains. The household wastewater discharges into a septic tank where solids separation occurs over a short hydraulic retention period of approximately 72 hours. Effluent leaving the septic tank moves through a distribution system of piping and/or leaching chambers and thence on to gravel or soil with eventual percolation to groundwater.

The extent of the HHW discharge into the septic tank is dependent upon product user knowledge and her or his understanding of the impact that the HHW has on groundwater quality. Generally speaking, an uneducated product user is not going to visualize a potential environmental impact on groundwater quality when it is expressed in terms of parts per billion, ppb, i.e., a small quantity of HHW being flushed down the toilet or a sink drain with a presumed dilution effect. Even if the HHW product user is knowledgeable, household products do not necessarily carry a list of their toxic chemical ingredients. Instead, there may be a product warning such as "highly toxic," "corrosive" or "a strong sensitizer." This, accompanied by a sense of consumer brand name trust for a product, can contribute further to overlooking the possible wastewater stream contamination concern.

To further complicate the problem, there are the number of chemicals in our human environment that we are exposed to. However, the published peer review literature knowledge based upon toxicity test results is somewhat limited for the known overall chemical listing. If it is assumed that one does not live in a zero contaminant environment, then society, for reason of cost, may accept some degree of HHW discharge into ground water unless there is some bonafide evidence brought forth to justify not permitting the discharge. The extent of this permissiveness will be related to the public/regulatory perception of the human health hazard to the intended domestic water use.

Products being used in the garage or workshop, with some exceptions, are more apt to be disposed, although not necessarily so, via the ground surface, e.g., oil drained from an automobile or a lawn mower, rather than through the household plumbing drainage system. Careless gardening practices can contribute to nitrate and pesticide contamination of ground water either through mis-applica-

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tion of the product, in product storage handling, or by improper disposal of unused or leftover pesticides. The latter residue could inadvertently be disposed of through the household wastewater drainage system unless the user is educated that this is an unacceptable practice. This paper focuses on the impact of HHW discharges into the septic tank-soil leach field on groundwater quality and is not intended to address the land disposal issue of HHW.

PROBLEM SCOPE

To evaluate groundwater degradation by HHW discharges into an on-site sewage disposal system, the first step is to determine the extent of the quantity and concentration of these HHW in the household wastewater discharge stream. Secondly, the fate of these HHW as they move through the various stages of the on-site sewage disposal/treatment process needs to be known, e.g., a septic tank or aeration tank with its microflora population, thence on to the subsurface sewage effluent distribution/disposal mechanism, and lastly infiltration/percolation through the soil leach field. Another question is what happens to these HHW as they move through the vadose (unsaturated) zone, the vertical ground profile between the soil leach field base and the groundwater table.

This presentation starts with a discussion of some of the HHW that can find entry into the household wastewater discharge stream; summarizes some of the field studies that have been undertaken; discusses related groundwater monitoring research at on-site sewage disposal sites in Connecticut; and attempts to interpret the latter reported findings in terms of today's water quality standards/goals. The University of Connecticut studies were conducted through the auspices of the Storrs Agricultural Experiment Station and the Connecticut Water Resources Institute. Institute funds came from the U.S. Department of Interior, U.S. Geological Survey. Faculty input for the University of Connecticut studies was from the departments of agricultural and civil engineering, microchemistry and plant science. Cooperating in the study were the South Central CT Regional Water Authority (SCCRWA) in New Haven, CT and the State of Connecticut Department of Environmental Protection Water Compliance Unit.

SOURCES OF HOUSEHOLD CHEMICALS

Literature

Hathaway identified consumer product categories and general types of products containing toxic compounds used in and around the home which may eventually end up in the household wastewater discharge. Household products cited in order of frequent use were household cleaning agents and cosmetics followed by deodorizers and disinfectants. Infrequently used products can have a larger toxic chemical quantity discharge into the wastewater stream, e.g., paints, pesticides.

Most household products are not hazardous. For the products in the toxic chemical category, there are efforts (Wisconsin, CT Audubon Society) being made to keep the householder better informed on how to dispose of the waste product in an environmentally safe manner.

Field Studies

Tomson, M. et al selected nine septic tank systems at various geographic locations in the United States to determine the presence of chromotographable trace level organics (C-TLOs) in groundwater. They concluded that there are more than a hundred C-TLOs in domestic septic tank effluents which can impact upon groundwater. Many of these C-TLOs could be attributed to normal household products. Prevalent classes of C-TLOs in groundwater identified were: chlorinated hydrocarbons, plasticizers, antioxidants, aromatic solvents, and bicyclo compounds.

The travel distance from the soil disposal field for C-TLOs in groundwater varies with site conditions. Travel distance may be only a few feet (1 meter) in heavy clay soil as compared to several hundred feet (200 ft., 60 m) in sandy soils.

DeWalle, F.B., et al evaluated the presence of volatile organics in domestic sewage from a community septic tank that served 97 homes in a subdivision. Priority pollutants were detected in the raw sewage and showed a higher concentration during the weekend. Some of the priority pollutants observed were toluene, dichloromethane, chloroform, tetrachloroethane, and benzene. Hydrocarbons were significantly present among 48 compounds detected.

Organic chemicals such as benzene, naphthalene, phthalates, and tetrachloroethylene have been detected in wastewater flow from residential areas entering sewage treatment plants by Cooley et al. With municipal sewerage, possible infiltration due to aging or leaking sewer lines and storm sewers draining into the system are pathways that also need to be considered when evaluating the source of the HHW for the wastewater flow entering the water pollution control facility.

Studies of the impact of a domestic septic system on an unconfined sand aquifer by Robertson, W.D., et al suggests that there is a potential for groundwater contamination by certain constituents coming from septic systems that may be more widespread than previously acknowledged. Mobile plume solutes such as nitrates and sodium were observed at a distance of more than 300 ft. (100 m) from the tile bed at greater than 50 percent of source concentration. Such findings needed to be further evaluated in terms of what the implication is for mobile HHW solutes and the impact, if any, on groundwater sources being used for drinking purposes. If additional research is needed, then such in-depth investigations do require substantial financial support.

Groundwater monitoring of earthen septage treatment cells by Kolega et al detected the presence of organohalides beneath the primary cell with some organohalides exceeding the recommended limits to protect human health. These findings were of interest to a water utility, the South Central Connecticut Regional Water Authority (SCCRWA), New Haven, CT, when well fields are located at sites near residences that have on-site sewage disposal systems. The SCCRWA provided preliminary funding for investigating the impact of toxic chemicals from on-site sewage disposal systems on groundwater. A two year study supported in part by the Connecticut Institute of Water Resources followed.

CONNECTICUT DOMESTIC WASTEWATER DISCHARGE STUDIES

Sites Selected

Sites selected for the study were: 1) a cluster of four single family residences, each on a 1 acre (0.4 ha) plot of land; 2) three condominiums in southwestern and northeastern CT; 3) a community gravity fed septic tank leach field installation designed for 43 single family residences; and 4) a business-residential complex community system in south central CT.

Procedure

Groundwater monitoring wells (GMW) were either already in place or installed. Those wells constructed were of two inch (5 cm) diameter, schedule 80, polyvinyl chloride (PVC) pipe with one end slitted at one inch (2.5 cm) intervals for a three foot (1 meter) length and installed 3 feet (1 meter) into the existing water table.

A teflon sampler/bailer was used to collect the water sample. GMW were bailed to an equivalent water volume displacement prior to taking the water sample. Appropriate containers were used for water sample collection which was in duplicate or triplicate. Distilled, de-ionized water was used for rinsing and a sample was inlcuded for analysis. A portable cooler was used to transport the water samples collected.

Recognized and accepted laboratory procedures were followed for water sample analysis. Instrumentation used and purge and trap sparger unit information are described in the study references. Compound identity was accomplished by comparison of sample retention time to those of reference standards (RCS-170A, RCS-170B, Analabs, North Haven, CT).

Results

Twenty-five compounds were identified in the groundwater samples collected, Table 1. In addition, there were unidentified gas chromatographic peaks. For the six locations, there were a total of 40 site visits ranging from a minimum of three to a high of 10 at any one given location.

Discussion of results

In Table 1, PNQ is for a chemical that was present in the water sample but not quantified. For one sampling, trichloroethane was detected in the septic tank and leaching field but not in the GMW. There was a similar experience with t-1,3 dichloro-1-propane in which there were five detections made for septic tank contents; four in the leaching field effluent, but with no detection in the GMW samples collected during the same sampling period.

Difficulty was experienced in completing water sample analyses within two weeks after their collection. In such instances, it is possible to lose a low volatile organic compound (VOC) concentration due to the extended storage period. If a VOC was detected during the sample analysis, it is also possible but probably unlikely that the VOC could have been of a higher concentration.

Type	Concentration range, ppb		Frequency of occurence
	Min.	Max.	
Benzene	<1	2	3
Carbon tetrachloride	<1	<1	1
Chlorobenzene	4	4	1
Chloroform	1	520	9
Dichlcroethane	1	41	2
Ethylbenzene	PNQ	10	2
Fluorodichloromethane	1	220	5
Methane	Trace	PNQ	3
Methanol	PNQ	PNQ	2
Methylene chloride	4	4	1
1,1 dichloroethane	2	5	2
1,1 dichloroethylene	4	5	2
1,2 dichloropropane	2	3	2
Tetrachloroethylene	<1	4	1
Tetrahydrofuran	10	800	2
1,1,1-trichloroethane	1	14	5
1,1,1-trichloroethene	4	4	1
1,1,1-trichloroethylene	5	5	1
Toluene	1	50	8
Trans-1,2-dichloroethane	5	6	2
Trans-1,2-dichloroethene	4	7	2
Trans-1,2-dichloroethylene	1	1	1
Trans-1,3-dichloropropane	3	3	1
Trichloroethylene	1	3	3
M-Xylene	3	3	1
P-Xylene	5	5	1

Table 1. Chemicals detected in groundwater monitoring well (GMW) samples, in ppb.

The frequency for the detection of chloroform and toluene appears to agree with the findings reported by DeWalle, F.B., et al. These constituents were observed in nine and eight water samples, respectively. The presence of chloroform was attributed to the use of household bleach and/or drinking water supply chlorination.

Sources for toluene are brush cleaners, contact cements, degreasers, detergents, perfumes and shampoo. The toluene found in septic tank effluent can be removed effectively by aeration. This was further demonstrated in a Connecticut experiment using effluent from a RUCK denitrification system. Toluene was added to the system effluent and then mixed prior to being passed through a three foot (1 meter) high soil column having inside dimensions of 11 x 11 inches (28 x 28 centimeters). The column effluent was collected in a holding tank and then aerated prior to its final discharge.

For the constituents listed in Table 1, only one, benzene, exceeded the State of Connecticut Department of Health Services suggested action levels (Jan., 1988) for volatile organics and inorganics from a listing compilation of

22 compounds. The State action level for benzene was 1 ppb with the maximum concentration detection of 2 ppb being under the maximum contaminant level (MCL) criteria of 5 ppb as promulgated by the U.S. Environmental Protection Agency (EPA) in November of 1985. For the standards (January, 1986) of another state in the Northeast Region, New Jersey, benzene, carbon tetrachloride, and 1,2-dichloroethane would have been placed in the interim action level category. The New Jersey recommendation for these constituent concentration levels were that the sampling results be confirmed; there be periodic groundwater monitoring; and that alternative water sources and/or appropriate water treatment techniques be utilized.

In relating Table 1 to the drinking water regulations of the safe drinking water act, none of the constituents listed exceed the proposed MCLs as presented by the EPA (Feb., 1989). A number of the volatile organic compounds (VOC) shown, however, are listed in the unregulated VOC monitoring requirement for all systems. This does not apply to private, individual drinking water supplies and has to be interpreted accordingly for the impact of household hazardous wastes upon groundwater.

As to the source of some of the compounds shown in Table 1, benzene is contained in products such as adhesives, deodorants, solvents, tar removers, and thinners, besides being the result of gasoline spills or leaks. Methylene chloride can be found in brush and oven cleaners, spray deodorants, and waxes. Tetrachloroethylene is associated with contact cements, automobile and home cleaning products, pesticides, shoe dyes and polishes, and wax removers. Trichloroethylene is used with degreasers, upholstery cleaners, tar removers and waxes. Xylenes are found in gasoline, metal degreasers and paint removers.

HOUSEHOLD HAZARDOUS WASTE IMPACTS

From these results and that reported by DeWalle, F.B., et al and Cooley, et al, and assuming that HHW solute movement will be comparable to nitrate and sodium movement as reported by Robertson, W.D., et al, it is apparent that volatile organic compounds and hydrocarbons, if present in domestic wastewater discharges to on-site sewage disposal systems, can make their way into groundwater. State and federal guide lines will determine how this is to be addressed. If the maximum contaminant level goal (MCLG) for VOC is zero, the conventional septic tank leach field system as is will not be able to satisfy such a requirement.

A partial solution to the problem of HHW discharge into on-site sewage disposal systems is to alter the system design to include the removal of priority HHW. The University of Connecticut toluene experiment previously cited demonstrates the feasibility of this concept and justifies the conduct of further research both in the laboratory and in the field. The Connecticut experiment led to a laboratory investigation by Word, D. in which lysimeters were used to evaluate three typical Connecticut soils (Canton, Hinckley, and Paxton) for the removal of phenol, 2-chlorophenol, and 2,4,6-trichlorophenol. These chemicals, found in many household disinfectants, can be described as being non-volatile HHW having a wide range of biodegradability. This study found that biodegradation appeared to be

the major mechanism for removal of the phenolic compounds.

Better management and control of the HHW at its source can help to minimize the amount and type of pollutant entering the household wastewater stream. Product replacement, use restriction, removal from the market, or the development of substitutes are choices available to the consumer and/or product supplier. Accompanying this effort might be the development of voluntary standards for household products by a body representing the industry, associations, state and federal agencies, environmental interest groups, academia and the consumer. Entering into this question are the environmental and cost benefits derived from improved management practices for control of HHW as opposed to treatment of a sewage influent for HHW polutant removal. Educational endeavors directed at consumers and householders could contribute significantly to this management and control process.

Some environmental questions that can be posed are: how serious is the HHW influent problem; what is the likelihood that water quality standards will be violated by HHW influents; what is the range of HHW constituents that might be found in household wastewater discharges; and how should local or state governments direct their strategy or programs in the HHW influent area. The answers to these questions are not necessarily going to be found in this paper, in the references cited, or elsewhere, but the information provided/made available should assist the user in addressing the issues of concern as they relate to HHW constituents in sewage influent, and hopefully, be helpful to the decision maker where needed.

SUMMARY

Household hazardous wastes, if contained in the wastewater discharge stream, can make their way into groundwater after leaving a conventional septic tank leach field. The conventional on-site sewage disposal system is not designed to address this factor. The impact of HHW constituents on groundwater, and how these wastes are handled, is contingent upon the socio-economic and political climate and state and federal agency actions.

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DEVELOPING A COORDINATED HAZARDOUS WASTE MANAGEMENT PROGRAM FROM A WASTEWATER PERSPECTIVE

by Frank Filice

The San Francisco Clean Water Program is responsible for carrying out the City and County of San Francisco's Waste Water Master Plan. The objective of the plan is to reduce the volume of untreated combined sewerage overflow from entering the receiving waters of the Pacific Ocean and San Francisco Bay. As part of the total effort to protect the viability of the receiving waters, the Clean Water Program is embarking on a multi-departmental non-point source control measures program for the reduction of toxicants into the City's combined sewer system. This program, described as Best Management Practices (BMP).

The requirement for this program is through a National Pollution Discharge Elimination System (NPDES) Permit issued jointly by the Environmental Protection Agency and the Regional Water Quality Control Board. The permit is for both the operation of the Oceanside Treatment Plant and Southwest Ocean Outfall. The BMP program developed for San Francisco is an alternative to traditional end-of-the-pipe solutions for the treatment of combined sanitary flows. The program developed has three major components: Education, Regulatory Controls and Agency Controls and identifies three target groups: public, municipal and commercial/industrial.

The BMP Program focuses on current agency practices, evaluating existing regulations and proposes a series of activities which will promote public awareness and a better understanding of the impacts that certain household, commercial and industrial practices have on the environment through their discharge into the wastewater system. This paper identifies the development of the BMP requirements and why they were included as part of the NPDES permit; the inter-departmental relationship used to develop the program and the problems that can arise from an inter-disciplinary/inter-departmental program.

BMP's were developed is to assist in reducing the impacts of combine sewage overflows into the receiving water of the Pacific Ocean. The specific measures were proposed by the Regional Water Quality Control Board and evaluated by the City for their appropriateness. These control measures are as follows:

CONTROL MEASURES

EDUCATIONAL

E1 - Educate re: the impacts that result when oil, antifreeze, pesticides, herbicides, paints, solvents, or other potentially harmful chemicals are dumped into sewers.

city departments who would be involved in implementing these programs.

The role of the consultant was to collect, assess and organize background information, prepare the program plan and act as a liaison between the various City agencies and the Clean Water Program. The review committees' responsibilities to the program plan were to identify what programs the City was operating and how these programs could be modified to address wastewater issues. The departments playing a major role in developing the program were the Solid Waste Management Program, Department of Public Health, Industrial Waste Division, Bureau of Water Pollution Control and the City Attorney's Office.

Given the time constraints, the Clean Water Program and the Consultant shared the responsibility of data collection. Data collection began by placing phone calls to agencies that operated or prepared information on recycling, source reduction or waste minimazation programs. Requests were made for both information and referrals of other programs. As information was received, it was categorized, logged in and filed by source control measure. Also inter-departmental meetings began. As discussion took place between the agencies, it became apparent that many of the activities proposed for development were already underway in some form by the various City departments.

With a potential program network already in place, the program focus changed from gathering information to evaluating existing City programs and how these programs could be modified to meet the intent of the control measure outlined in the discharge permit. The ability to convey this information to the consultant helped in the development of a plan that identified and consolidated every source control program operated in the City into one document.

The Implementation Plan was developed in three drafts. The purpose of the first draft was to connect program elements to specific departments and have the departments discuss specific program activities identified in the Implementation Plan. This review phase determined the need to create a Program Management and Coordination Section which ranked activities, identified city agency responsibility, determined how the program would be guided and developed reporting procedures.

The purpose of the second draft was to include the comments from the first draft and focus review on the level of responsibility that could be assumed by each City Agency. During this phase discussion on financing specific elements began. Briefing meetings with the directors of the various departments took place in order to receive input. The third draft was an internal document for final review before submittal on October 1st.

E2 - Educate re: the proper use and management of fertilizers, pesticides, herbicides and other potentially harmful chemicals.

E3 - Educate re: the effective use of "housekeeping" practices, including the use of absorbents, cleaning compounds, and oil/grease traps for controlling oil and grease in gas stations, automotive repair shops, parking areas, commercial/industrial facilities and food service facilities.

E4- Educate re: the need to keep rainfall and runoff from contacting potential contaminants.

REGULATORY

R-1 - Research, strengthen, and enforce regulations which give the Discharger the legal authority to control the improper disposal of potentially harmful wastes.

R2 - Research, strengthen, and enforce regulations which give the Discharger the legal authority to control the improper disposal of soil, debris, refuse, or other pollutants into storm drains, sewers and catch basins.

R3 - Research, strengthen, and enforce regulations which give the Discharger the authority to require oil and grease controls in areas which are significant sources.(e.g., gas stations automotive shops, wrecking yards, machine shops, commercial/industrial facilities, and parking areas.)

R4 - Development and implement regulations which require landowners and/or tenants to provide covers to keep rain off areas which contain contaminants and to keep runoff from draining through areas which contain contaminants.

PUBLIC AGENCY

P1 - Label storm drain inlets and provide signs along the banks of storm drains, sewers, catch basins and creeks explaining the environmental impacts of dumping wastes.

P2- Develop and implement programs which provide convenient means for people to properly dispose of oil, antifreeze, pesticides, herbicides, paints, solvents, and other potentially harmful chemicals.

PROGRAM DEVELOPMENT

Under the conditions of the discharge permit, the City had until October 1, 1990 to complete the development of an Implementation Plan and Special Monitoring Plan to carry out the above stated control measures. The Clean Water Program used the services of a consulting firm and created a review committee of key personnel from

CONCLUSIONS

While the BMP Program developed for San Francisco is to reduce toxicants level in combined sewer over flows all municipalities will soon face the responsibility for reducing the impacts of storm drain runoff on receiving waters. Also with the public becoming more aware of the environmental benefits of recycling the issues of source control and source reduction are becoming better understood and easier to present.

The lessons learned through the development of San Francisco's BMP Program are:

- Identify the BMP's needed to resolve your problems
- Develop an inter-disciplinary/inter-departmental review committee
- Use existing programs and proven techniques whenever possible
- Create a dynamic program plan
- Include a feed back loop for program assessment
- Set priorities
- Identify funding sources
- Provide coordination between departments

Overview of Solid Waste Authority Hazardous Waste Collection Programs

David Gregory and Marc C. Bruner *

SUMMARY

The Solid Waste Authority of Palm Beach County, Florida began operation of a permanent Household Hazardous Waste Collection Facility (HHWCF) on June 9, 1990. This facility, a manned drop off point for hazardous waste, is the first of its kind in South Florida. It provides free hazardous waste disposal to private citizens in Palm Beach County. Many toxic products used by individuals perform valuable, necessary functions and are commonplace in todays society. Everything from pesticides to paints, and pool chemicals to engine oil, are safe when used and handled prudently. If these items are disposed of improperly they have the potential to harm people, wildlife, and the environment. The purpose of the Authority's hazardous waste program is to abrogate the potential harm caused by improper disposal of unregulated hazardous wastes.

Over the first weekend a collection event called STOP '90 (Stop Throwing Out Pollutants) was conducted. The permanent center is open to the public Wednesday, Thursday, and Friday 9:00 am-5:00 pm, and one Saturday each month (the second Saturday) from 9:00 am-Noon. As of September 30, 1990 the HHWCF has seen the following level of activity over its 5 months of operation:

Households participating in permanent program:	794
Total amount of hazardous waste handled:	107,059 pounds
Amount of hazardous waste recycled:	69,920 pounds

DEVELOPMENT OF HAZARDOUS WASTE COLLECTION IN PALM BEACH COUNTY

Hazardous waste collection programs in Palm Beach County began with the Florida Department of Environmental Regulation sponsored Amnesty Days in 1985. Amnesty Days is subject to funding approval by the state Legislature and cannot be relied on as a viable permanent hazardous waste management option. The Solid Waste Authority initiated its STOP hazardous waste collection program in 1987. The STOP program was repeated through 1989. DER's Amnesty Days was repeated in 1989 with the Authority making local arrangements for the program. STOP and Amnesty Days both provided free

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hazardous waste disposal for households. Amnesty Days provided free disposal for businesses. During STOP events, individual businesses were charged for disposal by the hazardous waste contractor.

STOP and Amnesty Days were conducted as temporary hazardous waste collection events. A site was selected (after permission from the site owner was secured), a hazardous waste disposal firm was contracted for collection services, and advertising was conducted to make people aware of the collection program. Hazardous wastes brought to the collection center were accepted from the participants and segregated by the hazard presented and disposal handling method. Lead-acid batteries, used motor oil, and reusable latex paints were recycled, unusable latex paints were dried and landfilled by Authority staff. The remainder of materials were packaged and disposed of as hazardous waste.

In the interest of public safety the hazardous wastes were packaged and secured at the end of each day. This required the contractor to provide a team of technicians large enough to process the volume of material delivered to the collection event. The hazardous wastes delivered were usually "lab-packed" for shipment. In this process, waste products in their original containers are inventoried and packaged into 55 gallon drums, following Department of Transportation guidelines. All materials were then manifested and shipped to hazardous waste facilities.

Temporary hazardous waste collection programs, while valuable and effective, have their shortcomings. The STOP programs were conducted on a semiannual basis, requiring everyone in the county who wished to properly dispose of their household hazardous waste to deliver it to a mobile collection center over the course of one weekend. Citizens unable to participate in the collection program had no option but to continue to store their hazardous wastes until the next collection event. Finally, the sites were not always the same, requiring participants to seek new locations with each collection event.

THE PERMANENT HAZARDOUS WASTE COLLECTION PROGRAM

The HHWCF is located at the North County Regional Resource Recovery Facility. The site consists of a 2,500 square foot main building, which houses offices, a laboratory, and a packaging/receiving area; a loading dock; three storage buildings for packaged wastes; a tank for the collection of used motor oil; and a large paved parking area. Equipped with personal protective equipment, safety showers, and continuously monitored fire alarms, the HHWCF was designed and is operated to meet the most demanding environmental and safety concerns.

The permanent staff consists of a secretary and three technicians trained in hazardous waste management and the safe handling of hazardous materials. Safety features engineered into the facility allow material to be bulked (small containers poured into large drums) which provides for more efficient disposal and recycling. The facility staff performs the characterization, packaging (bulking, lab packing, containerizing) and preparation of hazardous waste for shipment off site. Operating on a permanent basis eliminates paying for a large contractor staff and the associated overtime. Also, greater economies of scale are achievable along with the more efficient storage and handling.

Materials processed for off site recycling include paints and thinners, used motor oil, waste fuels (old gas from boats etc.), and lead-acid batteries. Some products are returned to the community, through community service groups, for reuse, particularly latex paint. More toxic materials (pesticides, cleaners, solvents, etc.) are packaged and transported to EPA regulated facilities for disposal. The permanent facility provides safe storage for materials which may be reused.

On average over thirty individuals a week deliver material to the HHWCF. Each participant is asked to complete a survey so that it may be determined who is utilizing the program. Results to date indicate that over 75% of those questioned have not participated in a hazardous waste collection program before. Fifty-eight percent of the participants drive 6 to 15 miles to reach the center.

Local newspapers, radio and television have provided information to the public on the hazardous waste collection program. Local health and safety officials have been made aware of the HHWCF and refer many people to the center. Solid waste haulers have been given information to provide individuals who contact them with hazardous waste concerns. Those who participate in the program also seem enthusiastic about spreading information on proper hazardous waste disposal.

ADDITIONAL HAZARDOUS WASTE ACTIVITIES

In addition to the HHWCF, the Authority provides the county other disposal options for hazardous materials. At the Authority's solid waste transfer stations, Used Oil Collection Centers have been established to provide convenient, free disposal for those individuals who change the oil in their own vehicles. A drum or tank into which used oil can be poured is located at each center. An area is also provided where compressed gas cylinders (propane from gas grills) and automotive batteries may be dropped off. Transfer station staff oversee daily operations. The oil is picked up by a used oil hauler who then provides for the recycling of this waste product. The HHWCF staff checks on these areas every two weeks and collects the other materials. A $25,000 grant was received from DER to establish and promote the used oil collection program.

A satellite HHWCF has been constructed at the Belle Glade transfer station which consists of a storage building, a fenced compound, and a used oil collection tank. Operating one Saturday each quarter, hazardous waste is accepted from the public and transported to the main HHWCF. A DER grant of $88,000 was obtained to construct and operate this center.

"Operation Clean Sweep" provides collection services to resident who are unable to transport their hazardous waste to the HHWCF. Palm Beach County has an appreciable population of retirees. Many of these people are unable to drive. The Authority will send a truck to pick up these hazardous wastes after the citizens telephone and schedule a pick up time. The Authority chemists package the material, and record the pertinent information on a bill-of-lading for safe shipment to the HHWCF.

Businesses and other concerns which generate small quantities of hazardous waste are able to make use of the Authority's hazardous waste

program. Conditionally Exempt Small Quantity Generators (CESQG's), which generate less than 100kg (220lbs.) of hazardous waste a month, are exempt from many hazardous waste transporting and disposal requirements. These very small generators find it difficult to obtain economical and timely hazardous waste disposal. Large contractors often are not able to economically meet the needs of these small businesses.

Under the program recently approved by the Authority's Governing Board, CESQG's submit a request for disposal and a description of their wastes for Authority approval prior to scheduling delivery. In becoming the generator of record of the waste, the Authority will be able to commingle the material from two or more CESQG's. This will allow for more efficient packaging resulting in a lower unit disposal cost to the small generator. CESQG's will be responsible for all costs associated with the disposal of their waste.

Future plans include expanding the program with a third collection center in the southern part of the county in 1991. This location will be opened to the public one Saturday each month and will be operated by the Authority hazardous waste staff. An opening date of March, 1991 is anticipated.

The total system planned by the Authority will consist of 6 satellite HHWCF's at solid waste transfer stations, plus the central facility. The satellite HHWCF's will be open daily for used oil, batteries and gas cylinders, and once a month for other types of waste. The central HHWCF will be open three days per week for all types of waste from households. All wastes from CESQG businesses will be delivered to the central HHWCF. Deliveries of CESQG waste will be scheduled for the two days during the week that the central HHWCF is closed to households

CONCLUSION

In 1989 the STOP '89 program saw 1,700 individual participate in the household hazardous waste collection program over 12 days of actual collection. Projections for the HHWCF participationshould exceed 2,000 individuals the first year, over 169 days of collection. The amount of hazardous waste collected is projected to increase 1.5 times over the previous year. The permanent program provides more thorough service to the county, as indicated in the increased response. The CESQG program will even further increase the utilization of the program countywide.

Since its inception, the collection program has attracted ever greater amounts of community interest and support. This program will continue to make positive steps safeguarding Palm Beach County's environment and the publics health.

TOWN OF STURBRIDGE
BOARD OF HEALTH
STURBRIDGE, MASSACHUSETTS

GEORGE BERRY

April, 1989

STURBRIDGE RECYCLING

The Sturbridge recycling effort really began in the fall of 1987. A newly appointed Board of Health was informed that the town landfill would reach capacity by the end of the year, and asked what did they want to do about it? After taking steps to extend the life of the landfill somewhat by restricting hours and commercial haulers, the Board began considering longer term solutions. In looking for these solutions, a few main goals were kept in mind. One goal was to keep open as many options as they could. Solid waste management is a rapidly evolving field, so the Board wanted to maintain as much flexibility as possible in order to take advantage of any advances in technology or technique. They also wanted to keep the costs as low as possible, and just as important, reasonably constant and predictable. Any solution had to be able to be implemented fairly quickly and had to be environmentally sound.

Contracting with a commercial hauler was rejected as either too costly or as too time consuming: the estimates for curbside pickup were in the range of $250,000 to $300,000 per year; the approval process necessary to place dumpsters or other containers around town for general use would have taken more time than was available. There was also the feeling that costs would go nowhere but up with short term contracts, and that long term contracts would place the town in a "put or pay" situation that would preclude the flexibility the Board desired.

The approach that was finally decided upon was one that would depend heavily upon recycling to reduce the volume of the waste stream. The town would request permission to open another landfill cell at the present site and make it last as long as possible. Failing that, the reduction in the tonnage of waste generated by the town would act to keep hauling and tipping fees charged by commercial haulers as low as possible. There could even be some money made by selling the collected recyclables, further reducing the total costs to the town.

The Board visited as many recycling operations in the area as they could find. In mid-winter 1988 an ad-hoc committee of interested citizens was formed to help the Board design and implement the recycling operation. An early decision was to start recycling "now instead of later". There were ready markets for glass and paper, and room at the landfill to place containers. So that is where the start

was made. This gave the committee experience with recycling and helped extend the life of the landfill. As markets for other things were identified, those items were added to the recycle list. In the meantime, plans were made and construction started on a permanent site that would primarily be a recycling facility, but that could also be used as a transfer station if need be.

The general policy that guided the committee was that absolutely nothing was to go into the landfill that had any other useful place to go. If a market for a material could be identified, even one that would cost the town to use, then it would be used. Non-recyclables that would burn, such as old furniture, could be sent to the incinerator in Millbury. Organic material, such as leaves and yard waste would be composted. Household hazardous material would be collected on a regular basis, stored, and disposed of by a licensed hauler. Items that people no longer wanted, but that were still usable would be placed in a "take it or leave it" area for other people to take home.

The recycling center is scheduled to have its formal opening in its new facility on May 13, 1989. On the same day, the landfill will be permanently closed to the public. We have started composting. We are currently recycling cans, glass, paper, old clothes, white goods, scrap metals, and auto batteries. When the center opens we will add plastic dairy bottles, used motor oil, tires, and a book swap and take-it-or-leave-it area. We have contracted with a licensed hazardous waste hauler and are deep into the approval process necessary to establish the household hazardous waste collection facility.

Recycling works. The landfill cell that was expected to reach capacity in January of 1988 has not yet reached its final grade level. But recycling is only a part of the overall solution to the problem of what to do with our solid waste. The next step, and ultimately the one that will have the most impact on the entire issue of solid waste management, is to find ways to reduce or eliminate the sources of the solid waste.

Board of Health
Town of Sturbridge

PERMIT # _____

STURBRIDGE RECYCLING CENTER RULES AND REGULATIONS

MATERIAL CATEGORIES	EXAMPLES	PREPARATION
CANS	Aluminum, tin (soup, food cans, al- Aluminum foil and containers)	Washed, flattened, paper removed
GLASS	Jars, bottles, (wine, beer, liquor, juice, etc.), [illegible]	Clean, separated by color - clear, green, brown - caps removed
PAPER	Newspaper, [illegible] & shoe boxes, wrapping paper, catalogs	Bundled or bagged in paper bags kept dry
PLASTIC	High density polypropylene - milk, cider, water, juice bottles	Clean, caps removed
WHITE GOODS	Dryers, washers, refrigerators, air conditioners	$5/each
METALS (scrap copper, brass, aluminum, wire, etc.)	Mufflers, tailpipes, catalytic converters, bikes, pipes, etc. Lawnmowers Wire	Drained of all liquids under 4' lengths or tightly bundled
COMPOST	Leaves, yard waste, household only, branches under 3" diameter	Branches under 4' [illegible] - no plastic
WOOD	Household remodeling debris Box, garbage bag, 2'x4' bundles Trunkload Large loaded station wagon Pickup (no side boards) [illegible] boards) (Trailer)	Under 4' lengths, [illegible] removed $3/ each $15/ each $20/ each $30/ each $45/ each
TIRES	Car - max. 16" Truck - max. 22"	$1/each, $2/each with rims $5/each, $8/each with rims
BATTERIES	Auto batteries	Capped, not cracked
CLOTHING	Usable clothing	Clean and dry
MATTRESS/BOX SPRING	Bed, sofa	$5/ each
BOOK SWAP		
TAKE-IT-OR-LEAVE-IT	Usable items, furniture, etc.	Clean
MOTOR OIL	Used vehicle oil	In plastic jug, delivered to monitor for accounting
PROPANE TANKS	B-B-Q tanks	
TRASH	Anything that can not be recycled	Bagged in translucent or see-through bags with number

Note: Compactor materials must have permit # and will be subject to inspection. Must not contain recyclable materials.

CHANGES MAY OCCUR DUE TO MARKETING NEEDS. THESE CHANGES WILL BE PUBLICIZED

On Saturday June 17 the Town of Sturbridge will hold its first Household Hazardous Waste Collection Day. All residents are encouraged to take advantage of this important service.

We all have hazardous chemicals in our homes. Check the list on this page. Many useful chemicals are toxic and can be hazardous to our health and to our environment. We don't have to stop using all these products, but we need to use them and dispose of them as safely as possible. In many cases, there are also alternatives to their use.

It is extremely important to keep these toxic wastes out of our water supplies and out of our landfill. Even small amounts of hazardous waste eventually add up to a big problem.

Please be very careful with all toxic materials. Always read the label and follow directions for proper use. Do not discard toxic materials on the ground and do not throw them in the trash. Do not pour unused hazardous material into toilets or sinks.

For proper disposal of household hazardous waste, PLEASE bring it to the STURBRIDGE RECYCLING CENTER on JUNE 17, FROM 10 AM TO 2 PM.

Wastes should be in CLOSED CONTAINERS, preferably in original containers WITH LABELS intact.

If you have a large amount of toxic materials or hazardous materials not on this list, please call the recycling center at 347-7608 or the Board of Health at 347-7291.

We hope to see you there.

HAZARDOUS HOUSEHOLD MATERIALS

Mothballs
Bug and rodent killers
Antifreeze
Wood preservatives
Car waxes & polishes
Rust removers
Metal polishes
Rug cleaners
Deodorizers
Degreasers
Weed Killers
Drain cleaners
Bowl cleaners
Paint thinners
Paint strippers
Brush cleaners
Paint: oil-based and lead.
Shellac
Varnish
Asphalt
Roofing Tar
Furniture refinishers
Furniture polishes
Bleaches
Gasoline
Kerosene
Oven cleaners
Nail polish remover
Brake fluid
Transmission fluid
Radiator Cleaner
Flammable liquids
Photographic chemicals
Chemistry sets
Swimming pool chemicals
Air conditioning refrigerants
Pesticides
Fertilizers
Spot removers and
Pills/Medicine

* Note : Motor Oil and Batteries can be brought to the Recycling Center during regular operating times, Tue,Thu,Sat 7:00 - 3:00 .

Household Hazardous Wastes

COLLECTION DAY

SATURDAY JUNE 17
10:00 - 2:00

STURBRIDGE RECYCLING CENTER
BREAKNECK ROAD, STURBRIDGE

STURBRIDGE RESIDENTS ONLY

Statistics of Household Hazardous Waste Collections

Oil

1989 Total Collection .... 1400 Gals
Participation 40 % Of 1400 permits

1990 Collection as of 11/01/90 1150 Gals
Participation 33 % Of 1500 permits
Projected Use 40 % of 1500 permits

Haz-Waste

1989 23 % of 1400 permits collecting
800 Gals Paint
16 Barrels Aerosols
8 Barrels of Pesticides and Poisons
8 Barrels of Acids and Alkali
5 Barrels of Flammable materials (Other than Paint)
Plus more

1990 25 % of 1500 permits projected
Increases in Paint
Avg 4 Barrels of Aerosols per Month
More Batteries collected
Less cost and full barrels

STURBRIDGE, MA.

TOWN OF STURBRIDGE
BOARD OF HEALTH
STURBRIDGE, MASSACHUSETTS

Site Clearing & Prep	$15,500..	
Retaining wall & Drains	45,000.	
Roll-off Containers (8)	9,600./yr	(lease to buy)
Baling Machine	10,000.	
Compactor	4,800./yr	(lease)
Bulldozer work	18,000.	
Paving	18.000.	
Fence	2,850.	
Alarm System	2,705.	
Oil Tanks & Reservoir	300.	
Telephone Installation	103.	
Telephone	240./yr	
Newspaper Trailer	1,200./yr	(rental)
Electrical Poles/Installation	16,000.	(to be recovered)
Portatoilet	840./yr	(rental)
Roof over Hopper	1,869.	
Consulting Engineers	4,000.	
Jersey Barriers	2,000.	
Take-it/Leave-it Building	800.	(materials only)
Storage Building	950.	
Signs	1,190.	
Electrician	5,100.	(parts & labor)
Landscaping	705.	
Tarps	1,890.	
Misc. hardware/paints	500.	(est.)
Monitors office	n/c	(From old landfill)
Wages	-	(Same as landfill)
	$164,142.	
Hazardous Waste Bldg/Install.	30,000.	
	$194,142.	

Stop Throwing Out Pollutants (S.T.O.P.) ON THE EAST END OF LONG ISLAND

ROBERT ARNER

Introduction

Eastern Long Island includes five towns covering a total of 232,541 acres. The five towns are: East Hampton, Southampton, Riverhead, Southold and Shelter Island. The total population of the towns is about 115,562[1]. Being that this is a resort area, populations may more than double during the summer. Large increases occur on the weekends year round.

Ground water protection is a key priority for Long Islanders. Because of this, on March 13, 1983, the New York State Legislature passed, and Governor Cuomo signed, the 1990 Long Island Landfill Law. After December 18,1990, landfilling will be severely restricted and in most instances municipal solid waste landfilling may be banned.

Given the concerns about groundwater quality on Long Island there are questions of the impact of harmful household chemicals upon the public health and environment. We must educate the public about the many products we use every day that have ingredients known to be hazardous. Estimates are that more than 30,000 of these common household products contain toxic chemicals. Although these materials are ubiquitous, the concentrations of hazardous ingredients specific to each product differs. For example, certain pesticides are extremely harmful while some household cleaners will slightly affect the environment. Harmful household chemicals are present in all homes. We must not stereotype their toxicity.

Under a New York State Department of Environmental Conservation grant (Local Resource, Reuse and Recovery Program) a not-for-profit alliance of the five east end towns was formed called the East End Recycling Association (E2RA).

[1] Long Island Lighting Company estimate 1/1/90

E2RA provides public education, cooperative marketing, and technical help through a three year grant. This grant, totaling $418,000, comes from State oil overcharge money (75%) and from the Five East End Towns (25%).

The East End exhibits diverse and abundant ecological resources. Many rare plant, fish and animal species inhabit the ecosystems. Beaches, bays, estuaries, lakes, freshwater and tidal wetlands and upland pine barrens, forests and fields are all included in the environment. The East End is also a large agricultural and summer resort area comprised of people from all walks and incomes.

The East End Towns will face much greater economic impact than the rest of Long Island as a result of the landfill Law, since the median income is 25% less than that of the total Long Island average. Also, the population density of western Long Island is six times greater than that of the East End. The law will cost the Towns millions of dollars per year to address making the per capita costs substantially greater then on the rest of the Island.[2]

Collectively the five Eastern Long Island Towns are landfilling over 180,000 tons of solid waste each year. Many control strategies for "non-point" and "point pollution" sources to surface and ground waters are basic to preserving the East End. Composting programs of all types are another important waste abatement strategy for the East End. A privately operated, 500 ton per day mixed municipal composting facility is currently being proposed for Riverhead. Removing the harmful chemicals from our soil amendments is basic to marketing the compost. As garbage cost increase, preventing pollution at the source becomes a critical strategy in protecting Long Island's most sacred resource, its drinking water.

Since 1984, the East End has sponsored single collection days termed by the acronym S.T.O.P. (Stop Throwing Out Pollutants). By operating a permanent collection facility to receive

[2]Dvirka & Bartilucci April, 1990

household hazardous wastes, participation increased. It became more convenient and is easier for residents to support. The Town of Southold was the first to establish such a permanent facility in the Eastern United States.

Program Objectives

Source reduction of household hazardous waste is our first priority since safely managing toxic chemicals is expensive. Most of our harmful household materials ends up in approved hazardous waste landfills or incinerators. Over time we would like decrease the amounts of pollutant coming into our facilities. Attitude change to buy less toxic material will also lessen the high disposal cost for Towns to operate these facilities.

A well organized public service campaign to make all East Enders aware of our S.T.O.P. program is crucial to promote that each person can be the solution to lessen pollution. This can be done by substituting less hazardous household products in the marketplace, and increasing public education by targeting the schools. E2RA's active and extensive recycling informational program involves all sectors of the East End. This includes outreach to small businesses to correctly store and dispose of hazardous wastes. Organizing a cooperative pick-up could reduce each company's cost. Also technical assistance predicates teaching "good housekeeping techniques" or pollution prevention at all levels to preserve our water.

The East Coast First Case Study in Permanent HHW Collection, The Town of Southold

Southold set up one of the first permanent household hazardous waste facilities on the east coast. In 1987 they bought their 20 ft. x 10 ft. safety storage facility for $18,000. In May of 1988 the Southold Household Waste Collection Center located at the landfill was in operation.

Until recently the S.T.O.P. facility was open to the public seven days a week from 7 a.m. to 5 p.m. To better manage the volume of household hazardous waste, the hours of operation are 7 a.m. to 5 p.m. on Tuesdays and Saturdays only. Trained hazardous waste management employees collect, segregate and package the waste into drums. When the drums are full (or at the close of a workday), transferal is made to the drum storage building. Within 90 days, disposal of the stored drums occurs. They are picked up by a licensed hazardous waste collector and taken to approved disposal facilities.

Accepted Wastes

All types of household hazardous chemicals are accepted at the Southold facility. Infectious, radioactive and explosive materials are excluded. Accepted items include: Adhesives, Alcohols, Antifreeze, Brake Fluid, Transmission Fluid, Charcoal Lighter, Cleaning Solvents, Degreasers, Engine Degreasers, Herbicides, Paint Removers and Thinners, Pesticides, Photo Supplies, Photographic Chemicals, Plant and Insect Spray, Pool Chemicals, Solvent, Spot Removers, Stain and Varnishes, and Wood Preservatives. This is only partial list of all the household waste accepted.

Procedures for Handling and Collecting HHW

Numerous precautions and safety requirements are followed in handling these materials. Identifying the nature and origin of incoming material is a key part of the STOP program. Unknown materials must be strictly accounted for. These procedures are specifically detailed in Southold's Operations Manual. Determining what type of hazardous materials are received is very important.

Household Waste Incompatibility

Household chemicals must be sorted and packaged into drums according to hazard class. When packaging waste, it must be

determined whether it is compatible with the waste that may be already in the drum.

Fishers Island

A part of the Town of Southold is a relatively remote island called Fishers Island. Located 12 miles off the eastern tip of the North Fork of Long Island, Fishers Island is a seasonal island. It's community consists of 300 year round residents and a peak summer population of 3,500. In the Summer of 1991, promotion and implementation of a one day STOP collection is planned. A budget of $25,000 has been submitted to the Town for approval of this program.

Lead Acid and Household Battery Recovery

The Town of Southold collects lead acid (car) batteries at the landfill. From January 1, 1989 to September of 1990, the Town recovered 29 tons of automotive batteries. If each battery weighs 36 pounds, that is 1,600 car batteries. Currently the Towns earn $.03 per pound for vehicle batteries. Shelter Island, Riverhead, East Hampton and Southampton also recycles auto batteries.

Of the seven types of household batteries, carbon zinc is the most popular. Estimates are that household batteries make up 1.5% of the total household hazardous waste stream[3]. Regardless of reduced mercury contents in manufacturing batteries, the Congressional Office of Technology Assessment still finds batteries the most common contributors of mercury in the solid waste stream.

Development of an extensive Household Battery Program by the Town occurred in 1988 with the cooperation of the Southold League of Women Voters. From July 1988 to June 1990, recovery of 12 tons of household batteries took place. A network of 50 depots such as Post Offices, Town Halls, some schools, and libraries participated as drop-off locations.

[3] University of Arizona

Shelter Island (pop. 2,500) Southold's neighboring Town, has a similar program of household battery collection. This done by a private individual who recovered over one ton of household batteries in 1989. The Town of Southampton has household battery collection in some of its schools in addition to the landfill and transfer stations. One elementary school class last year sponsored a battery collection depot at a nearby hardware store after E2RA spoke to them. The Town of Riverhead recovers household batteries at their recycling drop off area at the landfill. E2RA is expanding its battery collection to many more schools, libraries, and other locations.

Used Oil

Used oil is a substantial part of any household hazardous program. One gallon of used oil can pollute one million gallons of water (the drinking supply for 50 people for one year). By law an auto service or repair station or any station that changes oil must accept used oil for recycling. Outside the collection center Southold Town collects used oil in a 550 gallon above ground tank covered collection center. E2RA negotiated with the local used oil collector to pickup all the East End towns' used oil for free instead of charging 20¢ a gallon.

E2RA has distributed material on used oil as well as other HHW materials such as flyers, direct mailing and brochures. In addition an intensive PR recycling campaign, including several special radio PSA's were done professionally. A few were done by Peter Jennings of ABC News, at no cost, to alert consumers to recycle their crankcase drainings. E2RA developed and distributed a point of purchase decal to area retailers of motor oil.

In a recent New York State Recycling Conference, E2RA presented a paper on used oil. Numerous suggestions were made to the State. One was to get the Motor Vehicle Administration to publicize used oil as well as car battery recycling in their

Exam and educational materials. The other suggestion was to change the terminology of waste oil to used oil. Both of these suggestions are being implemented by the New York State Department of Environmental Conservation. E2RA has provided extensive technical assistance to various agencies promoting the safe recycling of used oil.

Paint Swaps

Southold has no official paint swap, although every once in a while a person will take some paint off the STOP table for their own use. Shelter Island has a wall where a variety of items are left for others to use. Paints and other other items now are not allowed to be left for the swap because of health and safety concerns. Paint swaps will be considered in the future.

Public Education

Increasing public awareness about HHW is fundamental to program success. Flyers, brochures, newsletters, direct mailings, newspaper inserts, posters and public service announcements have promoted the Southold STOP program. The League of Women Voters developed a community guide for the STOP Program. All real estate offices were hand delivered information on harmful household chemicals. They assist both buyers and sellers of new homes to safely return their toxics at the collection center. For example, the household battery program is clearly evident throughout the community with posters and collection containers all over Southold. Shortly, we hope to have household battery containers in every school. In addition, a HOTLINE number is promoted on all E2RA publications for further information. We receive over ten calls on the average a month with questions about HHW or our STOP program.

Economics

The population of Southold is roughly 21,000 people, depending upon the seasonal summer influx. Since the program began in

S.T.O.P
PROGRAM
(STOP THROWING OUT POLLUTANTS)

DISCARD
HOUSEHOLD
HAZARDOUS
WASTE
SAFELY.

GOOD ISLANDS ARE HARD TO FIND...
PROTECT OURS!

Printed on Recycled Paper

A GUIDE TO THE SAFE USE AND DISPOSAL OF HOUSEHOLD HAZARDOUS WASTE

Household Hazardous Waste (HHW), when improperly stored, used, and discarded, can cause serious harmful effects on our health and in the environment. Thus, we need to understand household hazardous waste and learn to handle it safely. This bulletin contains information about HHW harmful effects and safe disposal.

LOCAL STOP PROGRAMS

To ensure safe disposal of HHW, most of the municipalities on Long Island sponsor **STOP** programs. Periodic collection days are scheduled for residents to bring in HHW. Some municipalities have established permanent facilities where residents may bring in waste. To find out more about your town's program, call **(516) 751-7304.**

May of 1988, the Town has spent over $80,000 dollars on the program. This figure does not account for the labor cost (fifteen dollar an hour plus benefits). From June of 1988 to July of 1990, Southold had disposed over 145 barrel drums (55 gallons). It costs roughly $8,000 per pick-up. In 1987, Southold spent $18,185 on Safety Storage. In 1988, the total was $23,402. while in 1989, it was $20,724. So far in 1990, cost are roughly $40,000. The household battery program cost the town about $60.00 a month to pick-up batteries at 50 locations throughout Southold. The pick-up and safe disposal of over 96% of these household batteries are taken to hazardous waste landfills and the other 4% mercury and silver oxide batteries are recycled. The cost to transport the last shipment to upstate New York ran about $400 for 3,269 pounds of household batteries and the disposal cost was $675.

.

Compressed gas packs or aerosols cans cost the Town $540 per lab pack drum as do flammable solids. Lab pack drums of flammable liquids cost $190 a drum. Steel approved Department of Transportation drums cost $36 each. The transportation fee is $500 a pickup.

Besides these costs each employee must receive a OSHA, NIOSHA and EPA a full baseline physical examination costing anywhere from $225 to $400, which follows the regulations (29 CFR Part 1910.120,29 CFR 1910.134, CFR Part 1910.95, 29 CFR 1910.20).

In addition, other equipment (e.g. respirators, gloves, etc.) and now over $4,000 for air monitoring equipment is a new requirement to operate this facility. The prospect of utilizing local fire department air monitoring is being explored. Next year Southold may have spend over a total $75,000 for its STOP Program.

Cooperative STOP Program

The Towns of Shelter Island, Riverhead and Southampton all have permanent collection facilities which should be operational by the beginning of 1991. In their request for bids

Southold, Shelter Island and Riverhead specified free training if each towns's STOP program was serviced by the same vendor. The per person training fee is normally $500. (This is an intensive 60 hour course). By joining together we also hope to reduce the service costs since three Town pick-ups can be made in one trip. The Towns also are working to take their physical exams together (this will also reduce costs).

The Town of Southampton

Southampton Town is largest on the East End with population over 50,000. There staff is much larger and opted to have their municipal Fire Marshall conduct the House Waste Personnel Training Seminars. Since the Fire Marshall has completed a training program for hazardous materials, the New York Department of Environmental Conservation has requested that his instruction include specific waste determination, segregation and lab packing. The following items also must be addressed.

1) Types and amounts of waste accepted;

2) Procedures and methods for characterizing incompatible, ignitable, and reactive wastes; methods to demonstrate that such wastes have been rendered compatible, non-ignitable, or non-reactive;

3) Methods or procedures for characterizing other wastes, including types and frequency of chemical analysis to be performed;

4) Procedures for handling unknown wastes;

5) Methods for recording receipt of wastes, logging waste type, amount date and time received, and other pertinent information;

6) Procedures for handling large quantities of waste.

This training includes on the job characterization and lab packing of the HHW.

Permits

To obtain a permit for a S.T.O.P. facility, the solid waste consultants for Riverhead, Shelter Island, and Southampton submitted applications to construct and operate a permanent household hazardous waste containment facility. These applications were submitted to the New York State Department of Conservation (N.Y.S.D.E.C.). The application to construct gives a detailed description of the facility's activities, environmental setting, facility operations, emergency contingency plan, closure plan, estimates of operating, labor, regulatory compliance costs and technical drawings.

As these applications to construct were reviewed, the three East End Towns had three Safety Storage buildings delivered to their respective landfills in the winter of 1989. The STOP facility has spill containment sumps, explosion proof lighting and electrical equipment, air ventilation equipment, sprinkler system along with other protective measures. The collection area for HHW is located safely away from this facility which is secured by a chain linked fence. Only authorized workers are permitted in this area. The building is situated on a curbed concrete pad with seeded berms along the sides of the facility. A wooden structure sheltered area with a work table and wood protective shield is where homeowners will drop off their HHW. This facility is about 50 yards away from the STOP building. Numerous other environmental impacts were reviewed in this application, along with all the emergency procedures and contingency plans.

Cost to Operate

In Riverhead the storage facility costs $16,500, the concrete pad about $5400 installed, with fence $1,000 by the private

sector, $1300 for the concrete and $800 if installed by the Town.[4] Labor will run around $15.00 an hour plus benefits per person. Consultant fees to meet the environmental requirements and to fill out the permits cost $20,000.

Permit to Operate

Upon meeting all the construction requirements, having all equipment at hand, and completing 40 hours of class training for all STOP employees, E2RA has requested the N.Y.S.D.E.C. to provide Riverhead, Southold and Shelter Island with a conditional operating permit. This will allow the S.T.O.P. employees to complete the on the job training (lab packing, etc.) part of the course with Chemical Pollution Control Inc., their vendor.

As of January 1, 1991, the Towns open their new facilities, with a permit to operate. Every year employees will take an update course to be certified as a S.T.O.P. employee, as well as a physical exam.

Other Long Island Towns

E2RA has assisted the East End Towns in reducing and managing their harmful household chemicals. E2RA has provided East Hampton with bid specifications to hold several S.T.O.P. collection days in the Spring and Fall of 1991. E2RA has provided technical assistance and shared information with their neighbors. Brookhaven, Huntington, Islip are in the process of establishing a permanent S.T.O.P. facility. Nassau County, on the Western half of Long Island, has had a a STOP facility in operation for a few months. By exchanging information we stay on top of this ever changing field. Pooling together resources also results in administrative savings.

Questions

There are many questions in dealing with hazardous waste.

[4] Dvirka & Bartilucci , Riverhead - Solid Waste Management Plan, 1990

Where can the Towns find a way to safely dispose of aerosols in a less costly manner? Do latex paints have a significant mercury problem? What about insurance costs? Would a double lined landfill capture the HHW and remove these contaminants when the leachate is being treated? Is classifying a permanent HHW facility similar to a Treatment, Storage and Disposal, Facility (TSD) or more like a service station? What incentives could be created?

Conclusion

Household hazardous waste is not a significant percentage of the waste stream (less than 1%) yet a larger problem becomes an issue. We live in a complicated society filled with materials that can threaten our environment. There are many critics that argue that, for the relatively small amount of the waste stream comprised of HHW, the costs involved in establishing and maintaining a S.T.O.P. program is a foolish investment of the taxpayer's money.

Small towns do not generate the tax revenues to manage solid waste at today's exspensive standards. There is no question State and Federal support is needed to lessen these costs. Hazardous chemical materials are everywhere in our society. The sooner we identify their destructive capacity, the better we will reduce, reuse, recycle and properly dispose of these toxins. How we safely lessen, recycle and dispose of chemical wastes and hazardous materials will go a long way.

Five Long Island East End Towns
Household Hazardous Waste Management Program Review

Robert Arner, Recycling Manager
East End Recycling Association
116 Hampton Rd., Southampton, NY 11968

Southold Collection Center

Country Rd., 48, Cutchogue, NY (516) 734-7685
Mr. Jim Bunchuck, Assistant Superintendent of Public Works
Permanent Site since June 1988 open to the public 7 days a week
September 1990 Hours Changed - Tuesday and Saturday Only
Materials collected up to January 1990

1988

4.69 Tons of flammable solids, compressed gas, poison B solid, corrosive solids, all in 55 gallon drums.

1702 gallons of waste acid liquid, corrosive material, waste flammable liquid, waste alkaline liquid, waste poison B, waste liquid gas, all in 55 gallon drums.

Household battery recycling program at 50 business and government locations.

1989

10,000 gallons of used oil
18 Tons of car batteries
2 Tons of household batteries
aerosol

1990
(Jan. - Sept.)

9,235 gallons of used oil
65 - 55 gallon drums of toxics
15.4 Tons of car batteries
3.75 Tons of household batteries

Southampton North Sea Recycling Center & Landfill

Majors Path Rd., Southampton, NY 11968, (516) 283-5210
Mr. Brian Gilbride, Supervisor of Sanitation
Several Collection days in 1987, Permanent Facility planned to be in operation in early 1991 - open to public two days a week.

1989

17,365 gallons of used oil N/A car batteries, household batteries

1990
(January - Sept.)

67.06 tons of used oil
(19,160 gallons[a]

East Hampton Recycling Center & Landfill

Springs Fireplace Rd., East Hampton, NY 11930 (516) 324-7190
Supervisor David Paolell
Did some collection days. Two-one day collections S.T.O.P. Events planned spring & fall 1991

1989

8,646 gallons of used oil
18 Tons of car batteries
household batteries

1990
Jan.-May

8,970 gallons of used oil

Riverhead Recycling Center & Landfill

Howell Ave., Riverhead NY (516) 727-8194
Supervisor John Reeve
Some collection days in 1987. Permanent household facility operational in early 1991

1989

6,376 gallons of used oil
3.75 Tons of car batteries
just started household batteries

1990
(Sept. 1990)

7,900 gallons of used oil
16.66 tons of car batteries
1-55 gallon drum of household batteries

Shelter Island Recycling Center & Landfill

Shelter Island , NY 11964 (516) 749-1090
Mr. Frank Klenawicus Supervisor and Ed Walsh (516) 749-8834

Shelter Island has had several collection days in 1987-1990. Shelter Island has an interesting arrangement where their HHW is placed on a wall and certain materials like plants and other items are exchanged. Once a lot of HHW is accumulated, it is picked up by a chemical waste management vendor. This was discontinued due to health concerns in late summer 1990.

Permanent facility should be operational early 1991
Very aggressive household battery recycling program at Post Office and businesses.

1989

530 gallons of used oil
1 ton of household batteries
1.5 tons car batteries

1990
(Sept. 1990)

500 gallons of used oil
.5 tons. of household batteries
.8 tons of car batteries

THE R LETTER

REDUCE - REUSE - RECYCLE

Spring, 1990 **EAST END RECYCLING ASSOCIATION**
116 Hampton Road, Southampton, New York 11968 (516) 548-8128

Special Earth Day Issue - Celebrating 20 years When Recycling was introduced into our vocabulary

S.T.O.P. HOUSEHOLD HAZARDOUS WASTE

Did you know that many materials in your home are harmful chemicals if improperly used? Here are a few points to help you become more aware of how to control the improper use of hazardous household products.

Common hazardous household chemicals include:

Pesticides	Paints
Solvents	Cleaners
Batteries	Other Chemicals

What can you do? -

Be a careful consumer
Read Labels. Buy only the amount you need.
Buy the least toxic products available
Avoid aerosols.
Recycle your used Motor Oil and Car Batteries.
Never throw out your left over paint.
Try to give it to a friend, or if it is latex paint, dry it out before throwing it away.

Southold's recycling center has one of the nation's first permanent "S.T.O.P" or household hazardous waste collection facilities in the country. Riverhead, Shelter Island, and Southampton are shortly opening their own sites.

We will be the leaders in this country in keeping the drinking water free of toxins.

OTHER THINGS TO RECLAIM

- **COMPOST YOUR LEAVES**
  - Grass clippings and wood chips.
  - Vegetable refuse from kitchen or garden.
  - No grease, fat, bones, fish or meat.

- **USED OIL**
  - Put used oil in a clean plastic container with a tight lid.
  - Don't mix with paint, gasoline, solvents,antifreeze, etc.
  - Take it to your local landfill.

- **STOP**
  (Stop Throwing Out Pollutants)
  - These are shoe polish, disinfectants, paints, pesticides, cleaners, etc.
  - Don't throw these down the drain or into the ground.
  - Separate from trash; collection sites are being set up.

- **BATTERIES**
  - Don't throw out
  - Bring household and car batteries to landfill

Take to Local Landfill or Full Service Station

Every year American's Throw Away The Equivalent of 35 Exxon Valdez's

RECYCLE

HOUSEHOLD BATTERIES

DON'T THROW AWAY THOSE OLD BATTERIES.
DISCARDED BATTERIES ARE A SIGNIFICANT SOURCE OF GROUNDWATER POLLUTION

PLEASE DEPOSIT YOUR HOUSEHOLD BATTERIES HERE

A MESSAGE FROM THE EAST END RECYCLING ASSOCIATION

A Diverse Corporate Program - Dow Chemical

Carey Brannan

I. Introduction:

(Maybe a Carey Brannan antidote to start off with.)

The corporation employs 62,000 employees--24,000 of those are employed in the U.S. We have five (5) divisions in the U.S. that produce a variety of products which include everything from basic commodity chemicals (name a few), plastic products, agricultural supplies, and pharmaceuticals like Novahistine (cough/allergy), Seldane (antihistamine) and aspirin (for over 60 years). We also produce consumer products for food care like Ziploc Bags and Saran Wrap; home care products like Spray 'n Wash (stain remover) and Dow Bathroom Cleaner; and personal care products, such as Perma Soft and Textra hair care products.

We have been involved in household hazardous waste collection days since 1984 in a variety of ways--from the complete organization of an event, to assisting other groups with an event. We have developed training programs for our employee volunteers and have provided materials and speakers for elementary school classroom instruction.

I would like to give a brief overview of how each of our divisions have been involved in community household hazardous waste collection efforts and other efforts that have reduced usage of landfill space.

II. PROGRAMS

Eastern:

Our Allyns Point, CT facility has been involved in assisting a community sponsored collection day for the past three years. Dow has provided a collection site, reviewed contracts, provided a few volunteers, and paid for some advertisements (approximately $1,500). This is a yearly collection effort which contracts a commercial waste management company to manage the waste collected.

Louisiana:

Dow's Louisiana Division has facilitated a annual collection day since 1985. Over the years, the Louisiana Department of Environmental Quality, the League of Women Voters, and the Sierra Club have co-sponsored the events with Dow. In recent years, the household hazardous waste collection days have been linked with the collection of recyclable materials (plastic, aluminum, paper, etc.) Starting this year, the Louisiana Division plans to have collection days on a quarterly basis. A substantial number of plant employees volunteer their time to this effort.

Dow also manages school lab waste as a complimentary service to the Louisiana Department of Environmental Quality. We provide containers, labels, technical assistance, and incineration facilities.

Michigan:

This is where Dow held it first collection day in 1984. Dow was the original organizer of the event (co-sponsored with the League of Women Voters and supported by others) until 1987. In 1988, the community took over the effort. Dow still manages the collected waste for the communities (Midland, Bay City and Saginaw) as a complimentary service. Several Dow employees volunteer their time and provide technical assistance at the collection days. The collection days are held 4-5 times a year during the spring and summer months and are by appointment only. The customer calls a number provided by the community and schedules a time to drop off the material. This allows a means to discuss the type of waste being dropped off, any transportation concerns, and helps level out manpower needs.

At both the Corporate headquarters office and the Michigan Division manufacturing facility, there is a strong office paper recycling program called PRO (Paper Recovery Operation). It is projected the program will save 81,000 cubic feet of landfill space and help save over 17,000 trees each year. Over the last four (4) months, the PRO Program collected 525,000 pounds of paper.

Texas:

Dow's Texas Division has facilitated an annual collection day since 1985. They did miss 1988 due to the start-up of the incineration unit. The Texas program is supported by an aggressive education program for all of the 5th and 6th grade students in the surrounding communities. Like Louisiana Division, a lot of Dow volunteers make this event work.

Western:

Dow's Western Division has provided assistance in a collection days that collect recyclables such as paint, batteries, etc.

The Pittsburg, CA facility also has a strong plant recycling program that encourages employees to recycle paper, plastic and aluminum waste generated at work. They also encourage all employees to bring to the plant recyclable material generated at home. The recyclable material is picked up by an organization called, "Many Hands," and they use the material to generate revenue for their organization.

As you have seen, we have been committed to making household hazardous waste collection days work in the communities surrounding some of our facilities. I hope I have illustrated some of the many ways an organization can get involved in this kind of effort.

III. Close - Why Be Involved?

These collection programs provide an opportunity for Dow to communicate and raise the awareness of the importance of proper waste management. The efforts in household hazardous waste reduction mirrors our internal efforts at reducing waste at the source, as a first priority, then utilizing recycle techniques, then treatment, and as a last option, using a landfill.

It also allows Dow people to work with government agencies and environmental organizations on a positive environmental program. Relationships are strengthened and a more productive work atmosphere can be developed in order to work on less-positive issues.

We are also providing a service to the communities to whom we owe our existence. We, at Dow, are vigorously finding ways to reduce the impact of our operations on the environment, just like these collection programs help our surrounding communities reduce their impact on their environment.

Minnesota's Event Collection Program

Donna Portner
Minnesota Pollution Control Agency
11-2-90

History

The Minnesota Pollution Control Agency (MPCA) conducted a pilot household hazardous waste collection and education project in 1985 and 1986. The result of this project was legislation which gave the MPCA the authority to set up a permanent household hazardous waste program, to consist of an education program and the establishment and operation of household hazardous waste collection sites.

Since 1987, the MPCA has operated a permanent household hazardous waste program. Under the program, the MPCA began establishing Regional Programs to provide household hazardous waste education and collection. In addition, while the MPCA was establishing its first Regional Programs, it conducted 28 event collections in the state independent of these Regional Programs as another element of the statewide permanent program.

Each Regional Program is intended to serve multiple counties. Currently, seven Regional Programs are operating and, at this time, one permanent collection facility is located in each multi-county program. Event collections are conducted in all counties of the Regional Program, regardles of which county the permanent collection facility is located, in order to make the program accessible to all residents.

Basic Structure of Regional Program

The MPCA executes contracts with sponsoring counties to operate Regional Programs. The county sponsoring the Regional Program, in turn, executes contracts with surrounding counties for Local Programs, of which all contracts are approved by the MPCA. Under these contracts, the MPCA provides partial funding for staff, education program materials, equipment and supplies, collection facility development, hazardous waste contractor services, and administrative expenditures. All program funding from the MPCA is distributed to the counties in each Regional Program through the county sponsoring the program. The MPCA also approves of all county staff designated to operate program activities.

Currently, five of the seven Regional Programs have permanent collection facilities. Types of collection facilities in Minnesota range, in construction, from a roll-off debris box to a converted garage at a landfill to joint HHW facilities/recycling centers.

Conducting Collections Through Regional Programs--Staffing Responsibilities

Event collections can be very costly, especially in the numbers planned through Minnesota's Regional Programs. One method to reduce these costs is by having

permanent collection facility staff package collected waste to reduce our reliance on contractor services. Obviously, for a large turnout at a collection, we would arrange for some contractor staff to help package waste. In addition, unpaid community workers are trained to help Regional Program staff by directing traffic, unloading vehicles, preliminarily sorting waste, and bulking used motor oil at collections.

In the permanent program, county staff are responsible for organizing all aspects of a collection. Prior to the collection, they must publicize the collection, recruit and train workers, arrange for recyclers to accept used motor oil and automotive batteries, and acquire the following: all waste packaging equipment, personal protective equipment, and safety equipment.

On the collection day, county staff set up the site (dumpsters, tables, signs, traffic cones), oversee collection activities with MPCA staff, and either package all collected waste or assist contractor staff in packaging waste. In addition, the county sponsoring the collection funds fifty percent of all contractor costs for on-site assistance, transportation, and disposal services.

While county staff are responsible for all details of organizing for a collection, one of MPCA staff's main responsibilities is to annually train county staff on how to coordinate and conduct collections and product exchanges, waste management procedures, health and safety issues, emergency procedures, hazardous materials handling and identification, and categorizing and packaging wastes, to name the basics.

For the collection itself, MPCA staff is responsible for assisting county staff with general oversite of collection activities and signing manifests, when used. The MPCA also funds fifty percent of contractor costs, including on-site assistance, transportation, and disposal costs.

Waste Management at Collections

Latex paint, oil-based paint, and nonchlorinated solvents are bulked into 55-gallon drums at the event collection site to later be disposed of as hazardous waste. These bulked wastes, along with the lab-packed wastes, can be transported to one of two types of facilities. If a large volume of waste is collected and hazardous waste contractor staff are present for the collection, wastes would likely be transported directly to a permitted hazardous waste storage facility. Alternatively, if a small volume of waste is collected, they can be transported to one of the permanent collection facilities in the Regional Program to be consolidated with other wastes.

The collected used motor oil and automotive batteries are transported off-site to local collection centers.

WLSSD--Type of Mobile Unit

The Western Lake Superior Sanitary District (WLSSD) is currently a four-county program and is in the process of adding four more counties. The interesting thing about this program is that all but one of the current and potential counties are sparsely populated. If all proposed counties join the program, the WLSSD program will serve approximately one quarter of the state's geographic area.

Because of the enormous area served by the VLSSD Program, numerous event collections are conducted every year. The staff uses a rolloff debris box mounted on a semi-trailer to transport all collection site equipment, including packaging equipment, to the collection location and haul the packaged waste and site equipment back to the facility where they consolidate partially-filled drums. They have mounted a platform on the back of the truck where staff bulk paints and solvents. The advantage of this platform is that drums are filled while on the truck and, therefore, don't need to be loaded. Incidentally, this truck is licensed as a hazardous waste transporter, the only Minnesota Regional Program that has such licensing.

Nev MN Rules for Household Hazardous Waste Management

On October 1, 1990 rules regarding special requirements for waste collected as a result of household hazardous waste management programs became effective in Minnesota. The goals of passing rules specific to household hazardous waste management programs were to relax hazardous waste generator requirements to encourage and facilitate such programs, as they provide a much needed social service. Additionally, the Minnesota hazardous waste rules do not specifically address household hazardous waste programs and it is, therefore, confusing as to exactly how the generator standards apply to these programs. The rules address collection, management, transportation, and disposal of household hazardous waste so that they will ensure worker and environmental protection while allowing household hazardous waste programs to continue and expand throughout the state.

The nev rules fall into three categories: permitting/record keeping, transportation, and other standard generator requirements. The nev rules clarify that permanent collection facilities need no facility permit to store wastes over 90 devs if they obtain permission from the MPCA Commissioner to do so, provided these facilities do not treat or dispose of wastes on-site and that they meet certain requirements for the use and management of containers. They also provide that any person who operates or establishes a household hazardous waste management program must notify the MPCA Commissioner prior to beginning the program in lieu of a generator disclosure and management plan. Lastly, annual reporting is not required, and personnel training requirements have likewise been reduced.

The rest of the nev rules, in effect, pertain to wastes collected at event collection sites and which are transported to permanent collection facilities. First of all, the nev rules require that collected household hazardous waste be transported either to a permitted storage, treatment or disposal facility or a MPCA Commissioner-approved facility for storage. The Regional Program's permanent collection facilities are considered Commissioner-approved facilities, once they receive permission to store over 90 days. Moreover, a licensed hazardous waste transporter is not required to deliver waste to one of the permanent facilities.

Generator identification numbers and manifesting requirements are less restrictive under the nev rules. A generator identification number is not needed until the collected waste is sent off-site to a permitted treatment storage or disposal facility. This affects event collections in that these collections sites no longer need an EPA generator number if wastes are transported to one of the Regional Program's permanent collection facilities.

Manifesting requirements are also less demanding. A shipping paper similar to a hazardous waste manifest can be used in place of the standard hazardous waste manifest. Therefore, official manifest tracking will begin only when wastes are directly destined for a permitted treatment, storage or disposal facility.

The main activity resulting from these new rules is that county staff can legally transport wastes collected as a result of a hazardous waste management program to a permanent collection facility in Minnesota without being licensed as a hazardous waste transporter. Once the waste is at a permanent collection facility, it can be consolidated with waste from other event collections conducted in that particular Regional Program or it can be consolidated with waste collected directly from residents at the permanent collection facility itself.

Three major benefits we expect as a result of these new rules are reduced staff time formerly spent in complying with more stringent regulations, more program flexibility in conducting collections due to a reduced dependence on contractor availability, and significantly reduced hazardous waste contractor costs. Contractor costs will be reduced in three ways: (1) a licensed hazardous waste contractor will no longer be hired to transport wastes to a permanent facility in the program; (2) only full drums of waste will be transported to permitted hazardous waste storage facilities; and (3) more drums can be shipped at one time to a permitted hazardous waste storage facility, provided storage space is increased at facilities.

Summary

Minnesota's program uses event collections to serve all areas of its multi-county Regional Programs which do not have easy access to the permanent collection facilities and so that each county need not invest in its own collection facility. These event collections are conducted with few or no contractor staff, to save on expenses. New rules passed October 1, 1990 relax the generator requirements for household hazardous waste programs without sacrificing personal or environmental protection. These rule changes simplify thr programs and enable the program to further reduce dependence on contractor services.

SESSION V. B. CASE STUDIES ONE DAY

Robin Bedell-Waite, Household Hazardous Waste Coordinator, Contra Costa County Health Services, Martinez, CA.

On June 9, 1990, we collected 16,000 gallons of used oil, 8,000 gallons of latex paint and 2,400 car batteries from 4,000 participants in seven different sites in the county. This is more than some permanent collection programs have collected in two years.

Contra Costa County's only previous collections were two small one-day events in 1985. Although permanent HHW collection facilities are scheduled to begin operations when the solid waste transfer stations come on line, the political and permitting realities are that those HHW facilities will not begin operation for another three years.

Decision to Hold a Recyclables Only Event

So why did we choose to do a recyclables collection event at this time? (1) We had some money, but not enough for a collection of the full range of HHW; (2) we wanted to provide a disposal option for people; and (3) we wanted to bring the HHW issue before the public eye to create a demand for a solution to the problem. If any of these ring true for you, a recyclables day may be an option.

You should also consider not doing this, however. Because we did not use an outside contractor, we used many volunteers--all of whom needed recruiting and training. Also, because we wanted substantial publicity and support throughout the county, we used a large number of sites--which served to greatly increase both our workload and the number of things needing to get corrected.

Although we were completely thrilled with the results of our efforts, having collected an enormous amount of waste, and having gotten incredible media attention as well as public and political attention, there was also a toll taken on those of us at the core who were managing the project. We greatly escalated our work effort by using a large number of sites, and doing everything ourselves, including volunteer recruitment and training, and extensive publicity. We in fact will not be doing a B.O.P. Drop again, but that is partly due to its success in building public support for other efforts to deal with HHW.

You might also consider, if you are doing one-day collection events, to alternate between collecting recyclables one month and collecting the remainder of HHW the next month. This is what Sacramento County does to keep down costs and deal in a more sensible way with the large volume of wastes coming in.

Uniqueness of the Project

Keeping in mind the two goals of the project, to collect as much waste as possible, and to bring the HHW issue before the public eye, the project's unique points were (1) using a community organizing approach; (2) co-sponsoring with our two major newspaper chains in the county; and (3) having the garbage collection companies hanging door hangers, or as we called them, "can hangers," on every residential garbage can in the county.

We used a community organizing approach to gather broad-based community support, and to involve many people in the planning process. Our co-sponsorship with cities, garbage collection companies, private business and particularly the media was critical to garnering community support. Had we not had the goal of bringing the issue before the public eye, in addition to the goal of collecting the wastes, we would not have gone to the effort to gather these co-sponsors. In particular, getting cities to co-sponsor took a fair amount of work.

Involving many people in the planning process, integral to community organizing approaches, insured not only broader support, but, we feel, a better end product. We used an active and diverse steering committee made up of city council members, garbage collection company representatives, community members, fire department and sanitary district personnel, and a representative from CAER. These members contributed an enormous amount of time and effort which we could not possibly have done without. We believe a number of creative and effective ideas came out of the planning group, including the event's name, the graphic work used on the flyer, the can hangers we used, and many solutions to operations issues.

The second unique aspect of the project had to do with publicity. We did not stop at press releases and advertisements. We obtained formal co-sponsorship with the newspapers, drummed up business and stories with individual reporters and worked with them to run editorials and front-page articles on both the event and the larger HHW issue. The co-sponsorship allowed us a more legitimate entry to the reporters. After the event--when we were exhausted--we followed up with articles and presentations on the success of the event and the need for permanent HHW programs. We did all of this with targeted TV and radio stations as well. We do not believe this coverage would have been availed to us had the event not included the entire county.

Putting can hangers, the third unique point, on each garbage can in the county simply spread the word in another, very effective way. We found that 50% of our participants heard about the event from the newspapers, and 30% from the can hangers. We paid about $8,000 for over 200,000 can hangers. I have to say that at one point, when it became apparent that we might get swamped with participation, we decided to go for all the publicity we could get, including going ahead with the can hangers, and deal with being

swamped later. We were, or course, not dealing with the full range of HHW, and so had the "luxury" of choosing this route.

Miscellaneous Points

Cost: The project cost $82,000, not including any of my staff time to organize the project, which I estimated to be about 50 work days before the event and 25 days after the event. Included in the $82,000 was about 250 hours put in by our Hazardous Materials Specialists, $30,000 for paint reprocessing, and $11,000 each on printing and on the disposal of the non-recyclable wastes which managed to come in.

Volunteers: We used about 150 volunteers, mostly from industry, and required them to attend one of three one-hour trainings we provided. This was done the tuesday, wednesday and thursday prior to the event.

Paint reprocessing: Finally, we had no trouble at all in distributing the 9400 gallons of reprocessed latex paint returned to us. The only glitch was that because we completely overloaded Major Paint in Southern California with our paint, it took three months before it was returned to us. Housing authorities and those doing graffiti abatement were particularly pleased to receive the paint. The county kept about 30% of it. We were of course very careful to let them know that it was exterior paint, which was best used as a primer.

Michael Bender

Vermont's Exempt Small Quantity Generator (ESQG) study was done by the Environmental Law Foundation for the Central Vermont Regional Planning Commission (CVRPC). The purpose of the study was to assess the extent of the ESQG problem by first identifying generators and then characterizing types and quantities of ESQG hazardous waste generated in the 34 town area of the Central Vermont Solid Waste Management District (the "District").

A list of the ESQGs in the District was compiled from several sources, including the following: ANR's Hazardous Materials Division, the phone book yellow pages and the business phone book, and records from both Vermont's Department of Health and the Occupational Safety and Health Administration. The ESQGs were placed in the following Standard Industrial Code business categories: electronics, auto dealers and repair shops, cleaning services, construction, granite, printing & photography, transportation and woodworking & finishing and others. A sample of these businesses were then surveyed which identified more than 650 exempt small quantity generators (ESQGs) of hazardous waste in Central Vermont, compared with the 151 such generators presently on file with the Vermont Agency of Natural Resources (ANR).

The types of ESQGs listed above generate a variety of hazardous wastes, including: used oil, antifreeze, solvents & degreasers, paints and thinners, acids and bases, cleaning compounds, pesticide wastes, photochemical wastes and printing inks

waste. The study estimated the amount of ESQG hazardous waste generated in Central Vermont at 725 tons per year. Extrapolated Statewide, these figures indicate generation of over 5,000 tons per year of hazardous waste from Vermont's ESQGs. Of the high volume items, approximately one-half of the ESQGs sampled generated 393 tons/year of waste oil; around half generated 199 tons/year of solvents and degreasers; and one-third generated 70 tons/year of antifreeze and 50 tons/year of paints and thinners. Around 45 ESQGs generated 13 tons/year of photographic chemicals.

A ranking of the collected data by town seemed to indicate that the number of ESQGs was proportional to a town's population. However, more data from an expanded survey of other towns is necessary to validate this correlation. The study did not include quantities of hazardous waste for which no quantitative data were obtained, such as unused paints, lead-acid batteries, acids and bases, pesticide residues or printing wastes. Combined with ESQG categories not sampled, the estimates of the total quantities of ESQG hazardous waste may be low. Overall, unregulated hazardous waste from both ESQGs and households makes up at least one third of the hazardous waste generated in the State.

The study found that many of the small businesses surveyed were not aware of the environmental problems created by improper disposal of unregulated hazardous waste. As the District moves in the direction of excluding ESQG hazardous waste disposal in

landfills, CVRPC made the following recommendations:

1) a more expanded ESQG survey is carried out;

2) information and technical assistance are available to assist ESQGs in evaluating options for properly managing their hazardous wastes;

3) CVRPC and the District form an ESQG Steering Committee, made up of both community and business leaders to forge a cooperative approach towards finding the most cost-effective, environmentally sound programs available; and

4) the top priority of all educational and management programs begin by addressing toxic and hazardous waste source reduction to the maximum extent feasible.

In conclusion, this study found that many ESQGs don't have the resources or the expertise to identify or to research and evaluate various options for properly managing these wastes. Providing ESQGs with information and assistance will lead more businesses in the direction of proper management. Because of the diverse business types with different management needs, assistance programs should address the needs of specific types of businesses and hazardous waste streams. Finally, collection of ESQG hazardous waste for treatment and disposal will dramatically reduce the quantity of hazardous waste entering landfills. Only by removing hazardous materials from the solid waste stream can we ensure the integrity of landfill liners, decrease the cost and complexity of leachate treatment, and ensure the purity of our groundwater.

"Incorporating HHW & CESQG Waste Collection - Costs, Quantities, Participation"

by Karen Feeney

Santa Barbara County has included Conditionally Exempt Small Quantity Generators (CESQG's) in it's Community Hazardous Waste Collection Days Program since 1985. Usually, when I tell people this, the typical response is: You do what? You are kidding? How do you do that? Isn't that against the law? So, how do you get around the regulations? You would think we had a disease!

This paper will cover the following points:

1. The regulations that apply to our program,

2. The reasons why Santa Barbara County decided to expand its Household Program to include CESQG's,

3. Some specifics about our program including:
   a. the types of generators we see & the types of waste they bring in,
   b. the types of fees that we charge, and,
   c. our participation rates

By the end of my presentation, hopefully you will see that providing a collection program for small businesses is not scary (it's not even awful), that you can comply with regulations, and that you can offer a program that benefits the health, safety and environment of your community.

I. WHO ARE WE TALKING ABOUT?

This category of generators has been called a number of things: "Conditionally Exempt Small Quantity Generators" (CESQG's), "Very Small Quantity Generators" (VSQG's), "Minimal Quantity Generators", and Non-commercial Generators. All of these names refer to the same category of businesses that generate less than 100 kilograms, 220 pounds or 30 gallons of hazardous waste per month.

Everywhere in the country they are exempt from the regulations of the federal Resource Conservation and Recovery Act. You must review your own state's regulations to see how they are regulated within your state.

California is different from many other states in that it regulates all generators of hazardous waste. This means that, at least in theory, anyone that generates hazardous waste must dispose of it in compliance with state regulations (including households and CESQG's) In reality there is very little enforcement of households and CESQG's either at the local or state level. Agency representatives are too busy paying attention to larger generators.

Improper disposal of hazardous waste by small businesses has the potential to result in the same types of environmental and health and safety impacts that we have identified for households:

- injuries to trash collection workers
- contamination of surface and ground water

However, these generators typically produce more waste than households and, in some cases, waste that is more hazardous.

2. DOCUMENTATION OF THE PROBLEM

In April 1987, the University of California at Davis, in cooperation with the State's Senate Office of Research, prepared a study entitled *"Managing Small Quantities of Hazardous Waste Produced by Businesses"* . This study found that Small Quantity Generators (SQG's - businesses producing less than 1,000 kilograms, 2,200 pounds or 300 gallons of hazardous waste per month, includes CESQG's) have a difficult time managing their hazardous waste properly because they:

a. lack information about proper disposal/management practices,

b. cannot afford to implement proper waste management techniques although they may be cost-effective in the long run, and,

c. will continue their traditional methods of improper disposal (into the trash, down the drain or in a vacant lot) until adequate enforcement of regulations occurs. Currently state and local agencies do not have the resources to inspect and regulate more than the large quantity generators.

The report suggested that, in order to get SQG's to adopt proper legal waste management practices communities should:

a. provide incentives for compliance,

b. ensure alternative waste management options are appropriate and available to SQG's,

c. suggested alternatives:
   - increase enforcement at local levels
   - provide and/or subsidize route services
   - provide and/or subsidize transfer stations

d. provide education programs.

2. WHAT REGULATIONS DO WE HAVE TO COMPLY WITH TO PROVIDE THE PROGRAM? (Or in other words . . . Is the program in violation of state and federal regulations?)

As I mentioned previously, CESQG's are exempt from RCRA regulations. However, some confusion occurred at the National Household Hazardous Waste Conference in November 1988 as a result of a memo issued by the Environmental Protection Agency (EPA), Solid Waste Division. The memo stated, "If you combine household hazardous waste with waste from SQG's, the resulting mixture could be subject to RCRA", and discouraged household programs from collecting business waste.

Although it appeared that the memo would be correct if it referred to wastes generated by larger SQG's (producing more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month), since CESQG's are exempt from RCRA, I questioned the memo if it was referring to the CESQG's. I contacted EPA to ask them to clarify the memo.

I worked with EPA's regional office in San Francisco. EPA staff reviewed the 1988 memo, reviewed the existing regulations, and discussed the issue with EPA lawyers in Washington, D.C. The result was the attached letter. In essence it says that in the same way RCRA allows you to collect any amount of household hazardous waste from any number of households, you can collect any amount of CESQG waste from any number of CESQG's without being subject to RCRA.

At the state level, our program has met with varying levels of support from the Department of Health Services (DHS) over the years, primarily as a result of changes in staff. Every time a new staff member came on board and reviewed our variance request, we'd get the same reaction, "You can't do this?" I always asked, "Why not?"

After reviewing the regulations, the response from DHS has been the same. There are no state regulations that prohibit us from including CESQG's. In fact, state laws allow businesses generating less than 100 kilograms of hazardous waste per month to transport their own waste to a licensed facility without a manifest as long as they do not carry more than five gallons or 50 pounds of waste per trip.

However, DHS staff has had two concerns:

a. What about compliance with federal RCRA regulations ("There was that memo issued at the EPA conference in 1988 . . ."), and,

b. what would happen if larger communities, such as Los Angeles, started to do it. Would they be inundated with generators and not be able to handle it.

The EPA letter resolved the first concern. As far as the second concern, DHS decided that, since no one else was currently asking to include CESQG's, they would approve requests to include CESQG's on a case by case basis through the variance process.

Recently passed legislation, AB 2641 (Wright/Tanner), will make it much easier for communities to provide programs such as ours. Based on Santa Barbara County's program, the legislation authorizes communities to expand their Household Hazardous Waste programs to include CESQG's. After undergoing some clean-up legislation, the bill will also exempt communities that offer these programs from both the permit fees and annual operating fees imposed by the state. Without this exemption, Santa Barbara County would have been required to pay as much as $10,000 in permit fees and thousands of dollars in annual operating fees (depending upon the volume of waste moving through the facility). Please contact Assemblywoman Wright's office, (916)445-7676, or Assemblywoman Tanner's Office, (916)445-0991, to get a final copy of the bill.

3. WHY DID SANTA BARBARA COUNTY BEGIN TO ACCEPT WASTE FROM CESQG'S?

In 1985, Santa Barbara County entered into a Memorandum of Understanding (MOU) with the state to have the County enforce state hazardous waste regulations. This action created the potential for more comprehensive enforcement program and an increased chance that small businesses would be required to comply.

When the local Chamber of Commerce and League of Women Voters heard about this they were concerned about the impact on local businesses. Santa Barbara is located 90 miles north of Los Angeles. As a result there are few disposal options available to small businesses in the Santa Barbara area. Few haulers serve the area. Those that do charge fairly high rates. The question asked by the community was, "How could small business be expected to comply?"

The Chamber and the League put pressure on the County to give businesses some help to comply. They encouraged the County to expand its existing Household Hazardous Waste Collection Program to include small businesses. So they did.

4. WHO DOES OUR PROGRAM SERVE & HOW DO WE DO IT?

We offer five collection days each year at different locations around the County. The program is free to households. Businesses are charged a fee based on the volume and type of waste they bring in. All of our publicity emphasizes the business fee.

At the collection day events, all participants are asked to declare if their wastes are from a home or a business. Businesses are then routed into a separate lane from households. If a business should show up in a household lane (their types and/or quantity of waste will tip you off to them), they are asked to move over to the CESQG lane.

The business lane is staffed by representatives from County Environmental Health, County Agricultural Commissioner's Office, and local waste water treatment facilities. These people are familiar with the individual generators and the types of waste they produce. They inventory the types and quantities of waste for each business. The business is charged a fee based on the type and quantity of waste they would like to dispose of (see below). The business is then issued a receipt which can serve as a record of proper disposal. In addition, the businesses are required to sign a declaration form that they are a CESQG.

If a business is irate, and leaves without paying, we write down their car's license plate number. After the collection day, we have the ownership of the car traced and turn the name over to County Environmental Health for enforcement. If a business refuses to pay their bill, we take them to small claims court, where we now have a history of judgements in our favor.

Following the collection event, reports listing all businesses that participated and the types and quantities of waste they disposed of are sent to County Environmental Health and State DHS. The County checks to see that all businesses are CESQG.

You might be wondering what kind of business response might occur in your community? In Santa Barbara County, the communities in which collection days are offered vary based on population and the amount of urbanization. I will give examples from three different communities within our county. Maybe one of them is similar to yours.

Participation Rates:

For all of the communities, total participation continues to increase over time while the number of businesses participating remains somewhat constant (Figures 1, 2 and 3). The following figures are for collection events in 1990.

Area	Total Households	Total Participation (#)	Total Participation (% of total)	Business Participation (#)	Business Participation (%)
Santa Ynez Valley:	7,358	253	3.4	7	6.7
Lompoc:	19,367	720	3.7	24	4.7
Santa Barbara:	71,447	1,504	2.1	3	2.7

Types of Businesses

Figure 4 shows the types of businesses that attended our collection events in Spring/Fall 1990.

Types of Waste Collected

Figures 5 shows the proportional quantities of waste collected from all participants (both households and CESQG's) at our October 1990 event in Santa Barbara. For comparison, Figure 6 shows the proportional quantities of waste

collected from only the businesses at that same event. The businesses brought in greater percentages of paint, photochemicals, sludges and lab chemicals and a smaller percentage of motor oil than did households.

Quantities of Waste Collected

Similar to households, not everyone complies with the limits of five gallons or 50 pounds per trip (maximum three trips), but the majority does stay within the limits as represented by Figure 7. The largest generators have been local government agencies and a private estate.

Fees Charged

Figure 8 is a summary of the fees charged of businesses at the October 1990 event. The fees cover approximately 75% of the cost to transport and dispose of the business waste. The County subsidizes the remainder through a surcharge on the landfill tip fee. The majority of business pay less than $100.00 to dispose of their waste through the program.

Cost of Program

The cost per vehicle for our program is similar to programs that do not include businesses. (See Figure 9.)

Future Plans for Program

We are in the process of trying to site a permanent collection and transfer station. We intend to use two pre-fabricated storage units, each 8 ft. X 21 ft. in size. The facility would be open two days per week. The Environmental Impact Report for our first site is costing $100,000.00 and has taken over one year to prepare. This is more a reflection of Santa Barbara County's planning process than on the complexity or danger of the proposed facility.

5. CONCLUSION

People usually express fear and/or amazement at the fact that Santa Barbara County accepts hazardous waste from businesses as a part of their regular "Household" Hazardous Waste Collection Program. Some fears may be legitimate. There are a lot of CESQG's out there and the quantities and types of waste they produce can be large and hazardous.

Santa Barbara County's program has shown that a county sponsored effort to collect CESQG waste can be safe and cost effective. Such a program can provide small businesses with a convenient and economical solution to their improper hazardous waste management practices. A collection program for CESQG waste can also benefit the community at large, protecting the environment as well as general public health and safety.

What is the current alternative for these businesses? Illegal disposal.

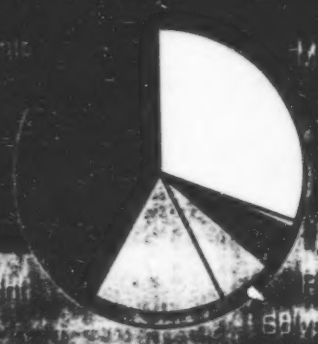
TYPES OF CESOG'S PARTICIPATING

(1990)

	Santa Ynez	Lompoc	Santa Barbara
Painting/Building Contractors	4	2	15
Electronics Manufacturing Firms	0	0	10
Public Agencies (City, County, Schools)	3	4	6
Graphics/Print Shops/Architects	3	1	6
Research & Development	0	6	5
Automotive	0	4	5
Landscape Contractors/Nurseries	0	6	4
Property Management	2	6	1
Agriculture	0	3	0
Miscellaneous	3	4	20
TOTAL	17	24	73

TYPES OF WASTE COLLECTED

(October 1990)



Total Waste Collected

Excludes batteries, asbestos, crushed concrete, and tires

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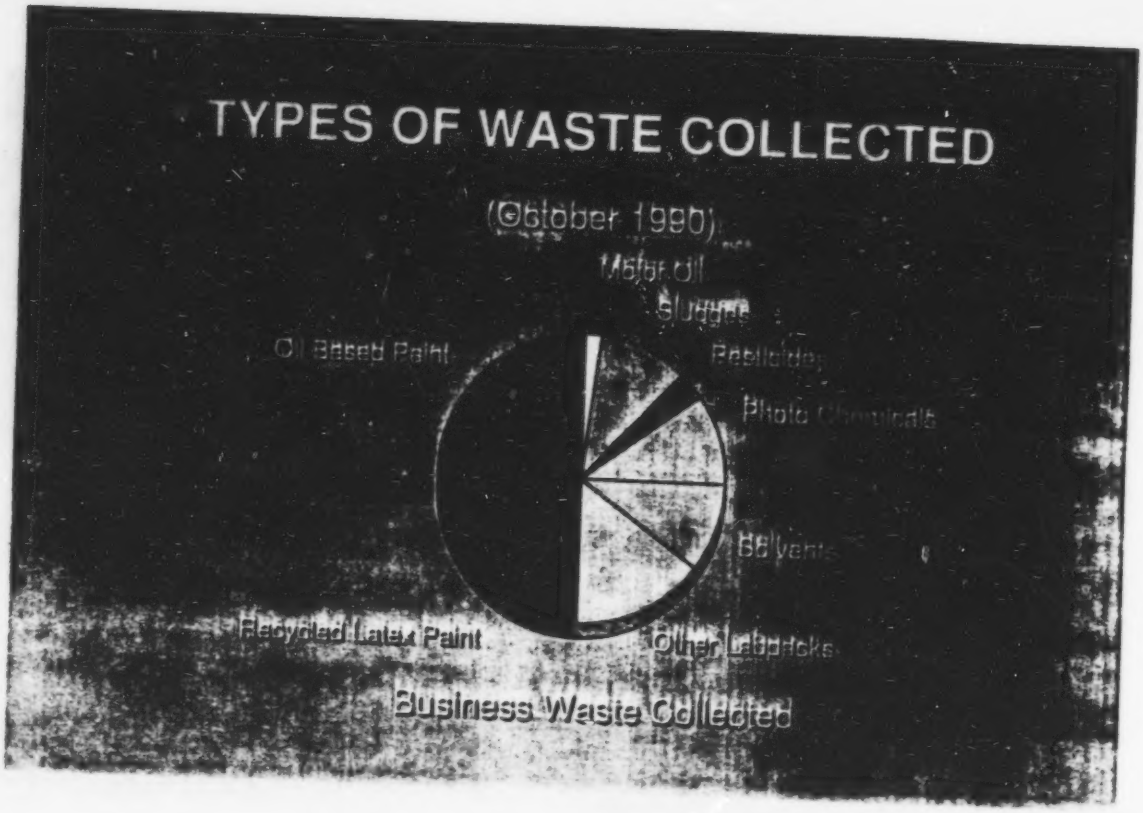
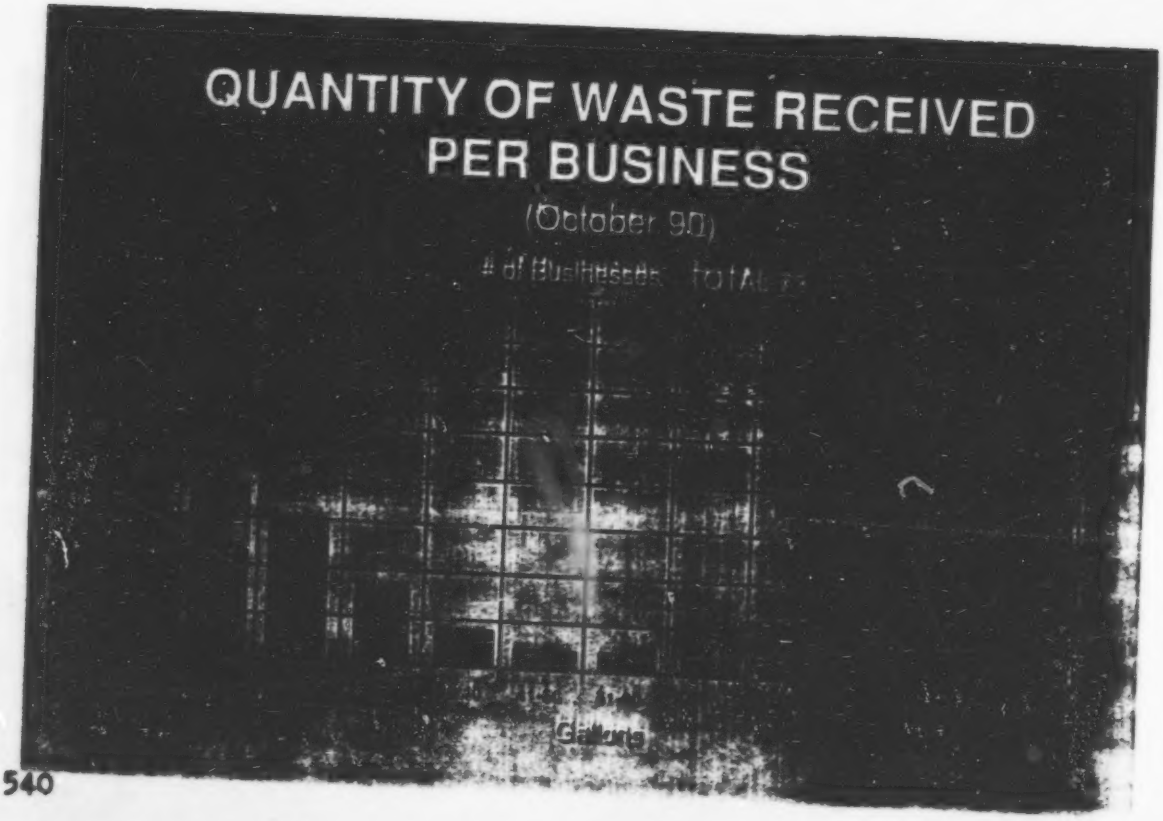
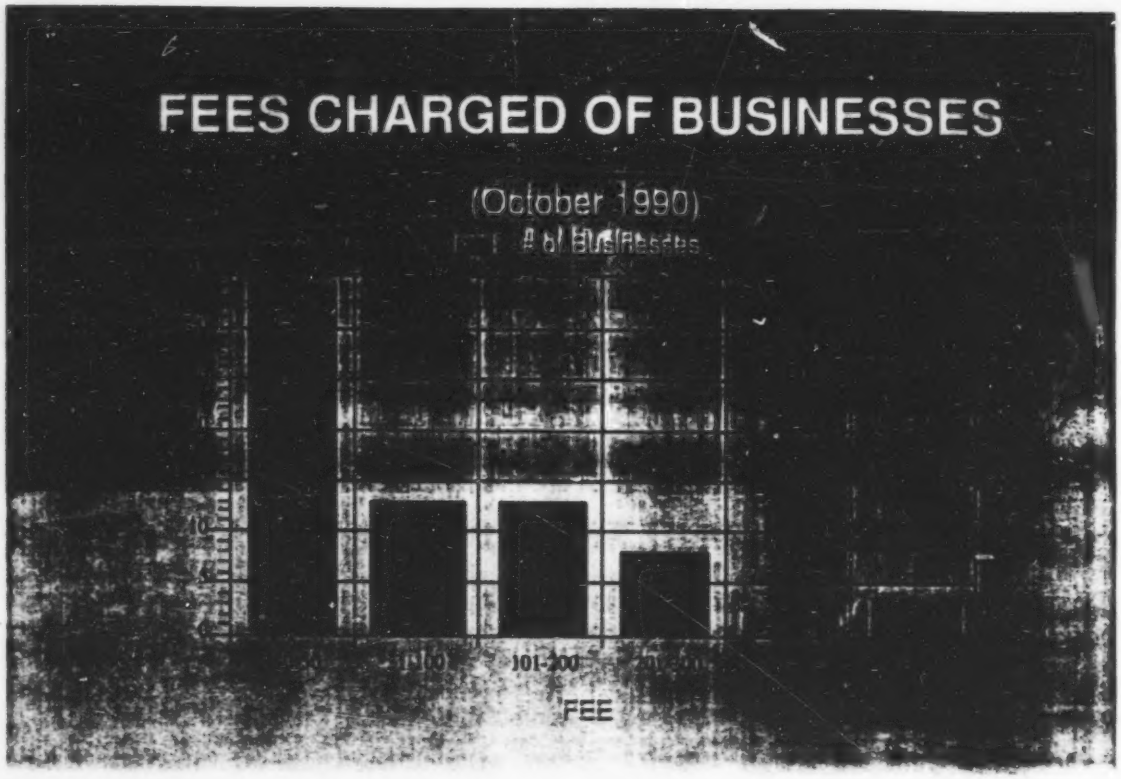
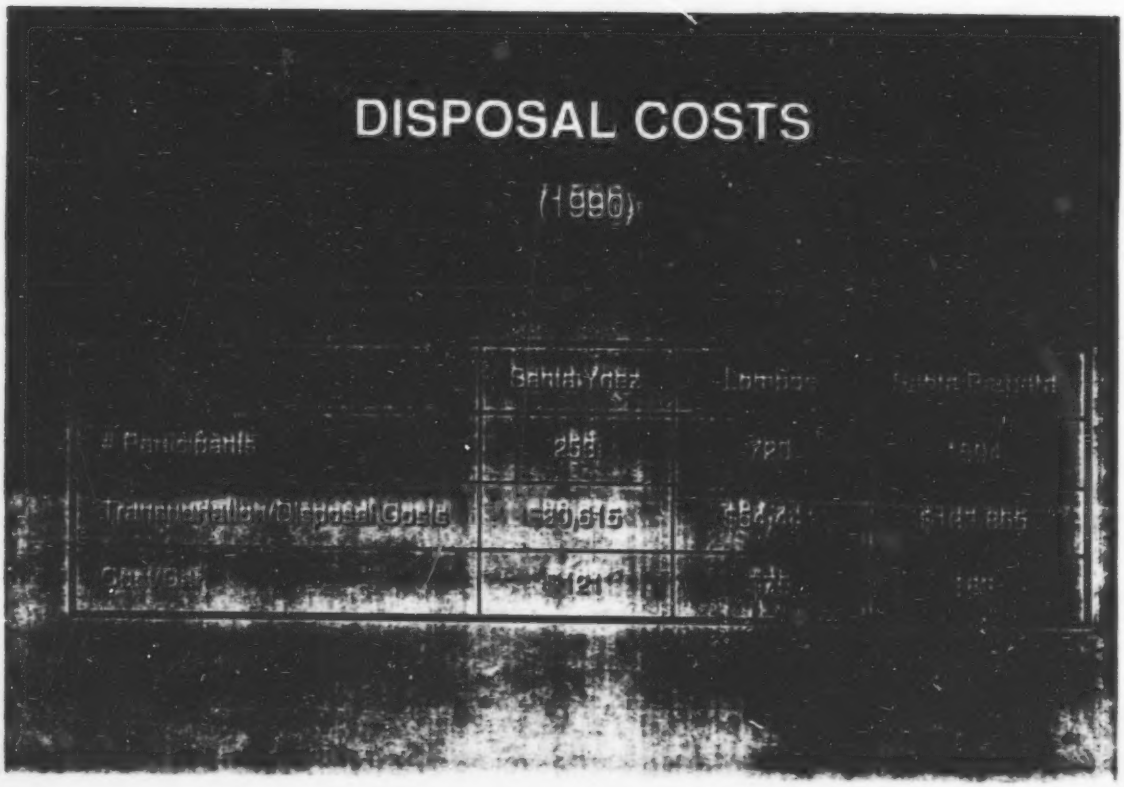

TYPES OF WASTE COLLECTED
(October 1990)
Oil Based Paint
Photo Chemicals
Business Waste Collected


QUANTITY OF WASTE RECEIVED
PER BUSINESS
(October 90)


FEES CHARGED OF BUSINESSES
(October 1990)
101-200
FEE


DISPOSAL COSTS

SESSION V C

Anchorage Experience with HHW from Permanent CESQG Waste Collection Program

Lawrence E. Wilkinson, P.E.
Northwest EnviroService, Inc.
Anchorage, Alaska

The Anchorage Permanent HHW Collection and Storage Facility was constructed in 1988 and opened to serve Anchorage residents in February 1989. The facility is owned by the Municipality of Anchorage and operated by Northwest EnviroService, Inc. One unique feature of this facility is that it accepts hazardous wastes from Conditionally Exempt Small Quantity Generators (CESQG) as well as from households. This paper describes primarily the findings from accepting CESQG wastes during the first full year of operation.

The Anchorage Permanent HHW Program Collection and Storage Facility is located 13 miles north of downtown Anchorage. The facility is located on the same site as the Anchorage Regional Landfill. It is open 5 days per week and is backed by a more centrally located collection facility that is open each Saturday throughout the year. During 9 consecutive days each May both facilities are open during the Annual Anchorage Spring Cleanup Week. Seasonal user activity is shown in Figure 1. A staff of 5 persons maintains both facilities including three hazardous waste technicians and a chemist. The Anchorage facility is a 6,000 sq. ft. engineered structure as shown in Figure 2. Even though one-million dollars was invested in this structure, a similar building in a more temperate climate could cost much less.

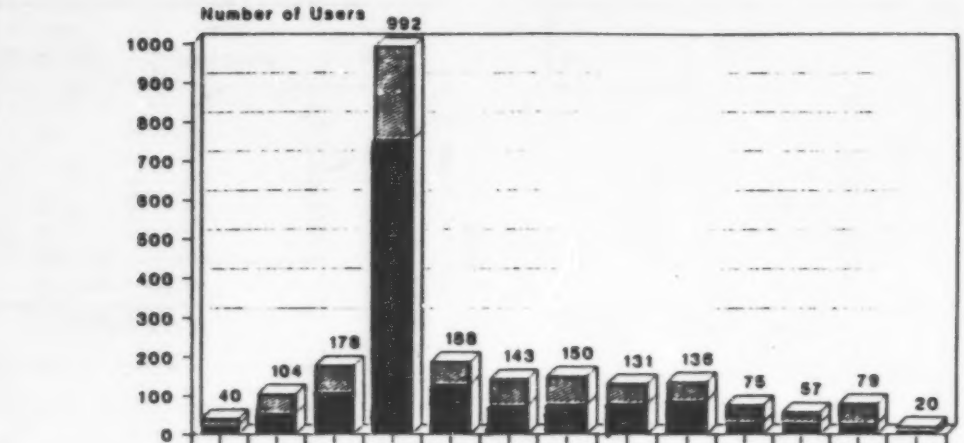
CESQ generators were assessed $1.00 per pound for all wastes when the facility was first opened. Considerable resistance was encountered with this simple and "expensive" pricing structure. Therefore, a new pricing schedule was developed that more nearly reflected disposal costs to the Municipality (Table 1).

Although only 11% of the generators serviced were CESQG's this user group accounted for 40% of the wastes recieved. A generator is asked to certify its "conditionally exempt" status before CESQG waste is accepted. The CESQG groups recieved are listed in Table 2. The hazardous wastes recieved from CESQG's are listed in Table 3. In total 64,000 items have now been recieved between mid February 1989, and the end of October 1990.

By the end of October 1990 nearly 1,200,000 pounds were recieved from a total of nearly 4,400 users. The waste categories collected from the CESQG's is displayed in Figure 3. Of this waste, nearly 60% is recycled and 5% landfilled. The balance is treated at the Northwest EnviroService, Inc. TSD Facility in Seattle. Some wastes are consolidated before being shipped to reduce disposal costs. The annual costs for operation of the facility are displayed in Table 4. Revenues from CESQG's amount to less than $100,000 per year. Fees attributed to householders is less than $10,000 per year. Although this HHW facility is obviously not a profitable operation, it does provide a useful alternative to landfilll and sewer disposal.

Figure 1

Anchorage Hazardous Waste Program
Monthly User Activity



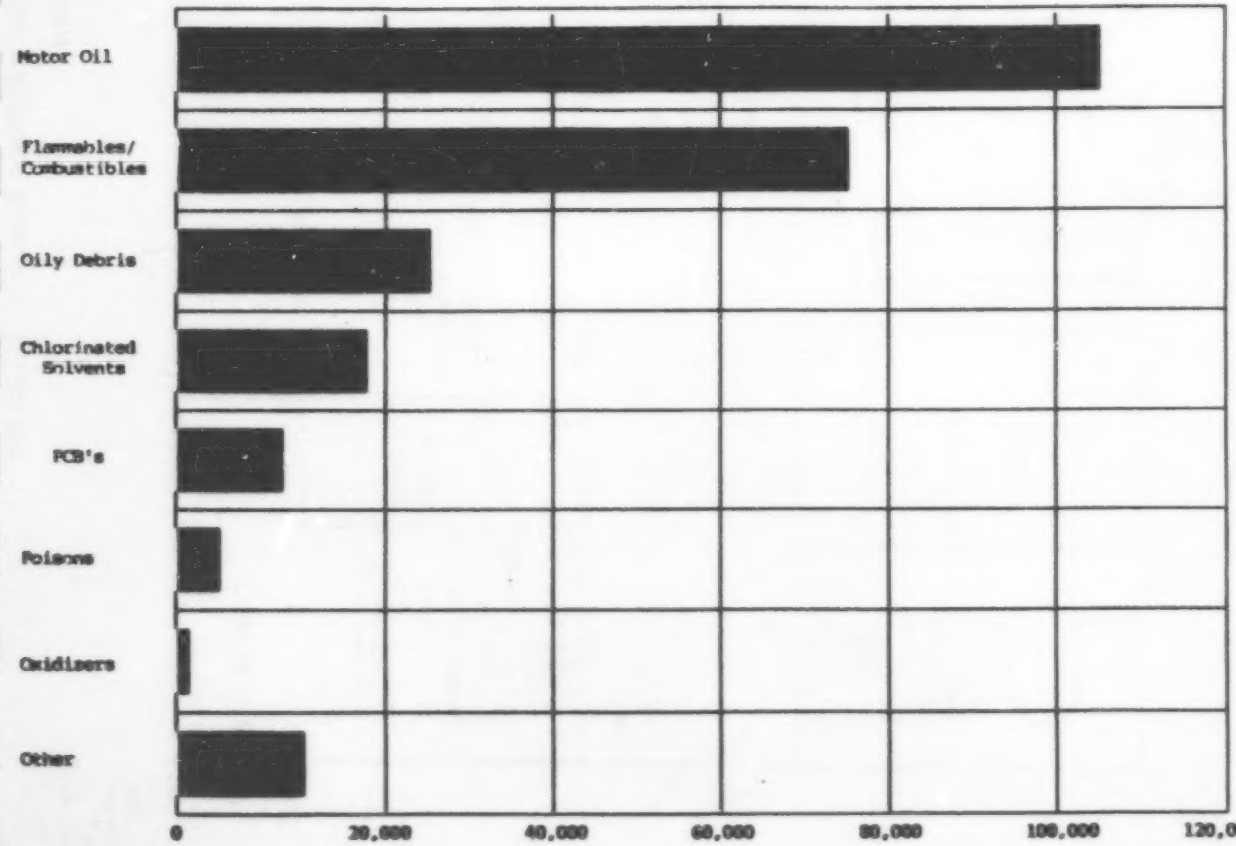
	Feb	Mar	Apr	May	Jun	Jul 89	Aug	Sep	Oct	Nov	Dec	Jan 90	Feb
Regional Landfill	16	49	89	238	58	68	72	50	48	44	28	51	11
Central Transfer	24	56	109	754	130	75	78	81	88	31	29	28	9

Central Transfer (Household)

Regional Landfill (Household & Non-Reg. Business)

February of 1989 and 1990 are half months only.

CESQG Produced Waste Categories
Figure 3



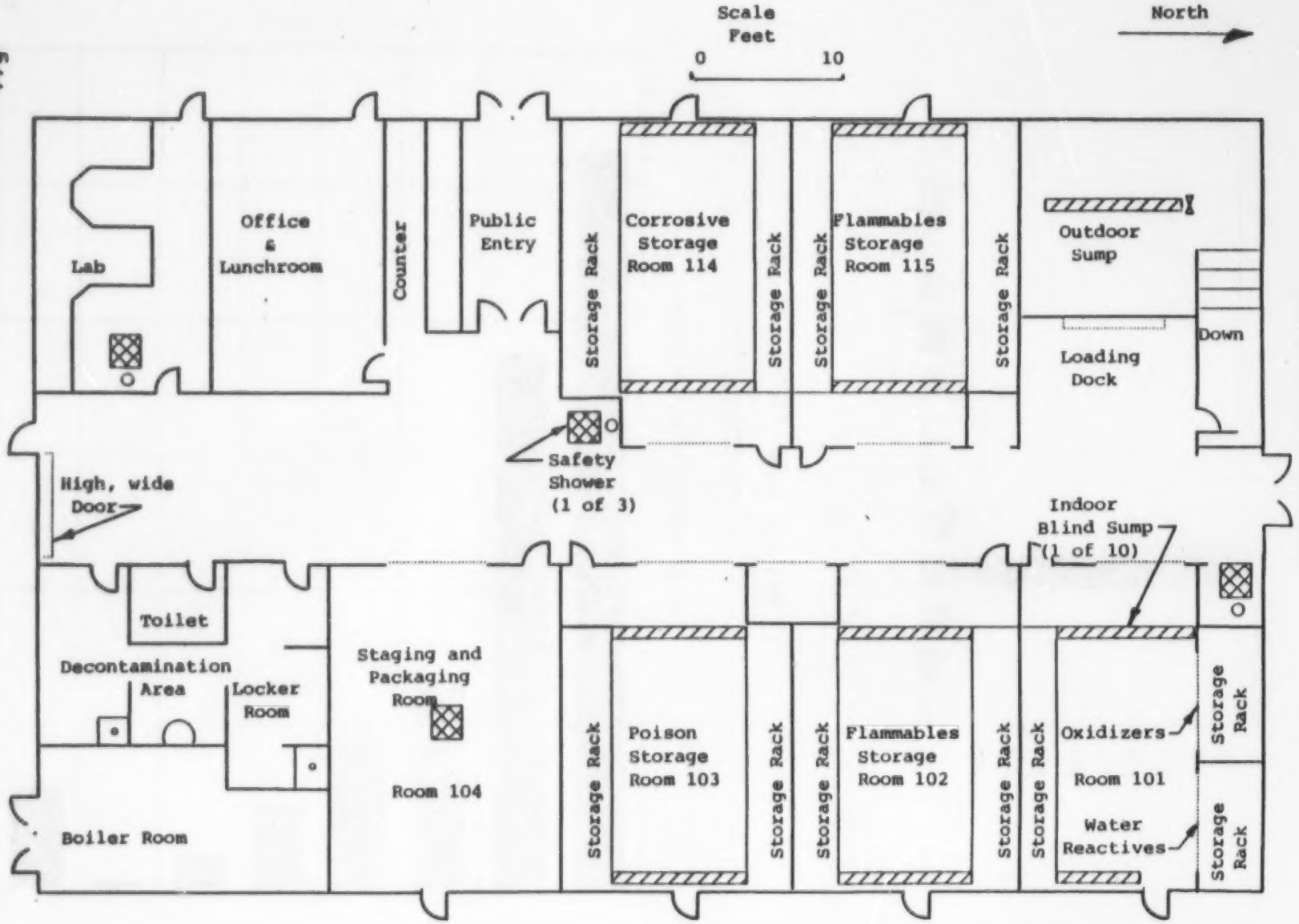


FIGURE 2

LAYOUT OF ANCHORAGE HOUSEHOLD HAZARDOUS WASTE COLLECTION FACILITY

TABLE 1

EAGLE RIVER HAZARDOUS WASTE COLLECTION FACILITY PRICE SHEET
FOR CONDITIONALLY EXEMPT SMALL QUANTITY GENERATORS

TYPICAL CONTENTS	PRICE
PAINT	
Paint	.50/lb
Varnish	.50/lb
Sealers	.50/lb
Adhesives	.50/lb
Epoxy resin	.50/lb
Aerosol paint	.50/lb
NON-CHLOR	
Solvents	.50/lb
Thinners	.50/lb
Xylene	.50/lb
Toluene	.50/lb
MEK	.50/lb
Alcohols	.50/lb
Car polish	.50/lb
Furniture polish	.50/lb
Copper napthanate	.50/lb
Formaldehyde	.50/lb
CORROSIVE	
Sulfuric acid	.50/lb
Hydrochloric acid	.50/lb
Nitric acid	.50/lb
Acetic acid	.50/lb
Soap	.50/lb
Ammonia	.50/lb
Oven cleaner	.50/lb
GASOLINE	
Gasoline	.50/lb
Blazo	.50/lb
White gas	.50/lb
JP4	.50/lb
Gas/Diesel/mix	.50/lb
Contam. oil	.50/lb
CHLORINATED SOLVENTS	
Spot removers	1.00/lb
Paint stripper	1.00/lb
Methylene Chloride	1.00/lb
Trichlorethane	1.00/lb
Carbon tetrachloride	1.00/lb
Perchlorethylene and Still Bottoms	1.00/lb

TYPICAL CONTENTS	PRICE
OXIDIZERS	
Organic peroxide	1.00/lb
Hydrogen peroxide	1.00/lb
Nitrites	1.00/lb
Nitrates	1.00/lb
Iodine	1.00/lb
Bromine	1.00/lb
Chlorine	1.00/lb
UNKNOWNS	
Unknown	1.00/lb
POISONS	
Pesticides	1.00/lb
MOTOR OIL	
Motor Oil	.70/gal
Linseed Oil	.70/gal
Tung Oil	.70/gal
Transmission fluid	.70/gal
Neatsfoot Oil	.70/gal
Hydraulic fluid	.70/gal
DIESEL	
Diesel/Dirty Diesel	.70/gal
Kerosene	.70/gal
ANTIFREEZE	
Antifreeze	.70/gal
Ethylene glycol	.70/gal
ORM	
Grease	.25/lb
API sludge	.25/lb
Asphaltic compounds	.25/lb
Moth balls	.25/lb
Oil Contam. Soil	.25/lb
NON HAZARDOUS	
Photo chemicals	1.00/gal
Latex paint	-0-
Car wax	-0-
Caulking compounds	-0-
Fertilizer	-0-

Table 1 (continued)

TYPICAL CONTENTS	PRICE
BATTERIES	
Lead Acid	5.00/ea
Ni-Cad/Silver/Mercury	.50/lb
Wet Alkaline	.50/lb
Dry Cells	.50/lb
PCBs	
PCB Solid	1.00/lb
PCB Liquid	1.00/lb
ALL OTHERS	1.00/lb

Table 2

546

Sectors from Which CESQG Wastes are Collected

Number of CESQG User	Percent	Pounds	Percent
Federal	9.1	20.404	7.5
State	8.1	20.817	7.7
Municipal	7.4	21.493	7.9
Realtor	9.4	25.937	9.5
Other	66.0	183.560	67.4
	100.0	272.211	100.0

Table 3

Fraction of Users that are CESQG's

Generator Mix	Number	Percent	Percent by Weight
CESQG	480	11	44
Households	3880	89	56
	4360	100	100

Table 4

Facility Operating Budget

Personnel	$440,700
Materials and Supplies	49,400
Analytical Expenses	18,700
Transportation	48,300
Disposal	232,400
Advertising	30,000
Other	3,500
TOTAL	$823,000

BARRIERS TO FARM PESTICIDE COLLECTION PROGRAMS

Charles P. Cubbage, Director
Michigan Department of Agriculture
Pesticide and Plant Pest Management Division

November 7, 1990

Existing federal and state laws and regulations coupled with existing attitudes of bureaucrats and farmers represent significant barriers to effective removal of unusable or banned pesticides. The Resource Conservation and Recovery Act (RCRA) and associated federal rules regulate the disposal of hazardous wastes, including waste pesticides. States may, if they have enacted state statutes consistent with the RCRA requirements, enforce waste management so that disposers of wastes have to comply with only one set of manifesting requirements.

In order to retain state primacy, a state must enforce the regulations consistently and in compliance with the federal regulations. As with any regulation or law, there are policy areas that are not clear cut where the crafted rules do not provide clear guidance or, in fact, may create conditions that conflict with the intent of the drafters. These grey areas may significantly increase as circumstances change from the conditions that initially mandated the policy. Such is the case with existing RCRA regulations and appropriately designed state programs aimed at reducing the environmental contamination potential of unusable pesticides.

The main problem is that participation in state farm pesticide collection programs is hindered by three things:

1. RCRA regulations.
2. Farmers's mistrust.
3. The enforcement posture of some state agencies.

RCRA REGULATIONS AND MISTRUST

RCRA was designed as the national hazardous material management policy. A "cradle-to-the-grave" manifest tracking system is intended to assure comprehensive environmental protection. Within the system, RCRA defines various regulated waste categories and generators based on the type and amount of wastes.

One of the categories is referred to as P-listed material that includes certain pesticides. Persons having 2.2 pounds or more of a P-listed material, technically, must have the waste collected at the source by a licensed waste disposal firm and sign an EPA manifest form. The obvious problem is that no farmer is anxious to acknowledge that he or she has the material and even less anxious to sign papers of ambiguous financial liability. Yet that is what is required technically.

Is the anxiety well founded? A Michigan situation paints what may be a fairly good picture of a "de facto" policy that any prudent observer (read that as "farmer") would think twice about before following the same "honest" path of checking with a state regulatory agency regarding disposal in the "right way".

The Charlevoix Farm Coop was going out of business. The Coop manager wanted to purchase the associated Coop hardware store. A pre-sale, store inventory revealed six (6) one gallon containers of the banned pesticide, 2,4,5-T. The current state and federal regulations resulted in a state decision that the hardware store building was identified as the repository for those six gallons until EPA approved a destruction methodology for dioxin containing materials. Needless to say, the bank would not issue a mortgage to the prospective buyer, and continuation of the hardware business was in jeopardy.

With such examples, the farming community will only reluctantly jump into a state supported program. What, then are the options to overcome the reluctance? Three basic components include:

1. A willingness on the part of federal and state agencies to identify that they recognize the "grey" areas of the regulations and by actions, demonstrate avenues to resolve the anxieties, if state collection programs have appropriate environmental safeguards.

2. Early involvement in the planning and implementation of any program by regional groups that have established rapport with the farm community, e.g., Cooperative Extension Service, Soil Conservation District, and/or Farm Bureau.

3. Contact with potential participants regarding the program by those that have the established rapport.

ENFORCEMENT POSTURE

With respect to the enforcement posture of some states, there have been various interpretation of state and federal regulations that either facilitate or block participation. The positive interpretations include:

1. A determination that the decision to identify a material as waste will be made at the collection site. This allows easy transportation to the site.

2. Designation of the contracted disposal firm as the generator of record so that the participant does not have to sign the manifest.

3. Establishment of a practical volume/weight cap (e.g., 100 pounds) above which manifesting is required.

Currently discussions are underway to ease the policy problems. EPA is looking at moving control of pesticide disposal from RCRA to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and interpretations by regional EPA offices have made collections possible.

It is essential that we recognize that regulations can defeat the intent of a policy. This fact needs to be foremost in the minds of the regulatory community as they apply the policies. At the same time, liberal interpretation of RCRA or the rules of course must be predicated on pesticide collection program safeguards to assure that the intent of environmental and human protection is not circumvented by "shortcuts".

MODERATE RISK WASTE PLANNING: THE WASHINGTON PROCESS

William P. Green
Washington State Department of Ecology

The moderate risk waste system of Washington, like many efforts in household hazardous waste, began in the early 1980's with the first round-ups in the Seattle area, and similar actions in other municipalities. A need for action on a state-wide basis was soon recognized. In 1985, the State Hazardous Waste Management Act was amended to require local governments to prepare local hazardous waste management plans, to cover both household hazardous waste and waste from RCRA-conditionally exempt businesses. The combination of these two waste streams was defined as "moderate risk waste", moderate implying quantity of generation, not hazardous character.

"Wastes that are exempt or excluded from full regulation...due to their small quantity or household origin have the potential to pose significant risk to public health and the environment if not properly managed. It is the intent of the legislature that the specific risks posed by such waste be investigated and assessed and that programs be carried out as necessary to manage the waste appropriately. In addition, the legislature finds that, because local conditions vary substantially in regard to quantities, risks, and management opportunities available for such wastes, local government is the appropriate level of government to plan for and carry out programs to manage moderate risk waste, with assistance and coordination provided by the department (of Ecology)."
Revised Code of Washington 70.105.005(10)

One of the key issues brought in at that time was the diversity of Washington as illustrated in Figure 1. Most of Washington's counties are still rural in nature, and are sharply contrasted to the fast-growing urban districts in Metro Puget Sound. There are also cultural differences between the counties east and west of the Cascade Mountains.

In 1987, funds were appropriated to provide 75% grants to local governments to prepare plans to manage moderate risk waste, called local hazardous waste management plans. Over the next three years, all jurisdictions in the state was issued a grant, amounting to an expenditure of $3.5 million. The jurisdictions grouped into 33 regions. Grants ranged from 12,000 to about 500,000 dollars. As an incentive, plans submitted before June 30, 1988 received 100% grants. Only one region qualified for this program. Also, monies spent on previous HHW collection events could be credited towards local match.

The first plan was submitted June 30, 1988, and was approved the following year. Further plans began arriving in September, 1989, nine months ahead of the June 30, 1990 deadline. One of these has already been approved. A total of 18 plans were submitted by the deadline. As noted, two have been approved, eight are involved in adoption proceedings, and eight are currently under review by Ecology.

15 regions received extensions from Ecology as provided by law. Of these, nine

have been submitted to date and are under review by Ecology. The remaining six will be submitted according to the extension granted, which may be up to December 31, 1990.

From figure 2, which summarizes plan submission status, it can noted the "snowball effect" from the metropolitan counties and a few innovative rural counties to encompass the whole state. One of the reasons for this was Ecology's assistance programs. As work began in the rural areas, the lack of technical and financial resources of these jurisdictions became evident. This lack of resources, by the way, was in stark contrast to the willingness of the early rural counties to participate. Ecology established an assistance program to ameliorate this lack:

Financial assistance: As described earlier, Ecology provided a minimum of three state dollars for each local dollar spent, effectively quadrupling resources available in each region to address the issue.

Technical assistance: Ecology provided the following:

- Clear guidelines on the planning process, including definition of minimum requirements for approval, a step-by-step list of the planning process, and a list of hazardous substances

- Assignment of Ecology staff to each region to assist in planning and implementation activities. Quarterly visits to each region by assigned Ecology staff was considered minimum service. Ecology staff acted as members of each Hazardous Waste Advisory Committee

- Provide information sharing activities such as mailouts and periodic meetings between regions

In 1989, the legislature required of Ecology a Problem Waste Study, a study to investigate selected problem wastes in Washington. Among the wastes selected for study were Used Automotive Oil and Moderate Risk Waste. For MRW, two sections of the report were required: a report on the progress in MRW management in the state, and a study of best available technologies for managing selected components of this waste stream. The technologies study would also make recommendations to the legislature on management practices. This study will be released next month.

The progress report was an excellent opportunity to put together, for maybe the first time, a look at the Washington State Moderate Risk Management System as a whole. Now, the state would not be limited to sporadic or regional efforts, but would be able to provide mutual and state support to each effort. The synergism that this system may encourage has yet to be seen as the plans are implemented in 1991. An example of these effects can be seen in the proposed collection system for HHW. In 1987, there were two permanent collection facilities in the state, and five counties holding regular (annual) collection events. As shown in figure 3, under system implementation, which may take to 1995, over 25 facilites are proposed, as well as seven mobile systems of one of more units, and at least a dozen collection events. Some regions are involved in feasibility studies and will add to those numbers.

Another exciting facet of implementation is the education systems which are due on line in all regions during 1991. This includes on site audits of businesses in many of the regions where this is feasible. This on hands work in educating small businesses has already been shown to be an effect means for "getting the word out".

The purpose of the MRW management system is to reduce the generation of these wastes to a minimum, and to divert the remaining wastes from the municipal solid waste and wastewater systems to proper management. This, by definition, required the involvement of each citizen of the state and provision to manage the waste produced. In Washington, it is estimated that this amounts to 25,000 tons of annual generation for households alone. A full, state-wide program implemented at the local level seems to be the best answer for us.

In process of developing the MRW system, several policies needed development, mostly in the areas of local compliance, businesses, and coordination. To list a few:

Local compliance:

- Should permits be required for collection events?
- Should permits be required for mobile units?
- Should permits be required for permanent facilities?
- Who should issue these permits?
- What regulations should be required for these permits?

- How are waivers/extensions to handled by Ecology?
- What are the procedures for obtaining a waiver?
- What are the criteria for granting a waiver?

- When is a progam adequate to the region?
- What happens when a local MRW effort collects regulated waste?

- What criteria are used to judge a region's implementation efforts?
- What reporting requirements does a region have on its MRW efforts?

Businesses:

- What happens when a local inspector encounters a regulated generator?
- What about businesses who vary in generation rates?
- What about businesses who aggregate waste and then become regulated?
  (This can happen under Washington's Dangerous Waste Regulations)

Coordination:

- What are options to a jurisdiction that does not want to join the regional system?
- How are indian tribes and federal facilities related to the system?

Not all of these questions have answers yet, but we are working on them. I wouls like to focus on three areas: permitting, waivers and implementation. In permitting, Ecology has tried to encourage local governments to get involved in the system. It has been felt that any <u>unnecessary</u> requirements would be detrimental to the system.

In this thought, we do not require permits for collection events. We are fortunate that METRO, in doing such an excellent job with the first round-ups has set an example that has kept our collection system incident-free. In addition, most events are now covered by state grants (50%), and some needs can be expressed in that contract and process.

Mobile systems we are still thinking about.

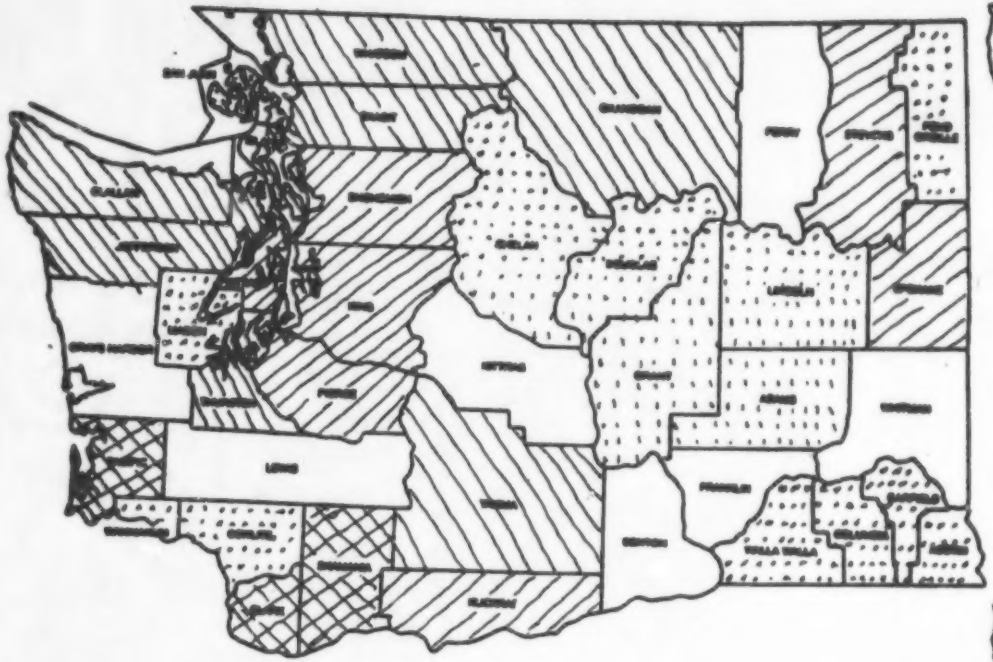
Permanent facilities will be governed by our Solid Waste regulations, which are under the process of revision to accept this new responsibility. In Washington, Solid Waste permits are issued by local health districts/departments. The actual requirements on these facilities will be developed as the regulations are put into place. A simple rationale for this decision is that there are two kinds of waste in Washington: solid and hazardous. By definition, MRW is not governed by Hazardous Waste rules.

In granting waivers, Ecology the same philosophy of avoided unnecessary burdens on the implementing governments. Two criteria were established, for example, when extensions were granted (waivers to the deadline). Is the additional time really needed, and will you plan be enhanced by the activities that take place in the added time?

Finally, Ecology will continue its support of local governments (first, with $3.5 million for 1991), and through the promulgation of Implementation Guidelines. Already staff has been hired in our regional offices to assist local governments in implementation. The Guidlines, due out in 1991, will provide the same basis for mutual understanding and team-building that the Planning Guidelines did.

And so we come to 1991, the year planning ends (so to speak), and the new system in Washington will be born.

Figure 2 - MRW Plan Status



Approved (Submitted up to 3 Sept 1989)

Undergoing Adoption (4 Sept 1989 - June 25, 1990)

Under Review - not extended (June 26 - 30, 1990)

Under Review - extended (July 1 - Nov 1, 1990)

Still in preparation

Reproduced from best available copy.

Figure 1 -- Washington -- Major Geographic Zone

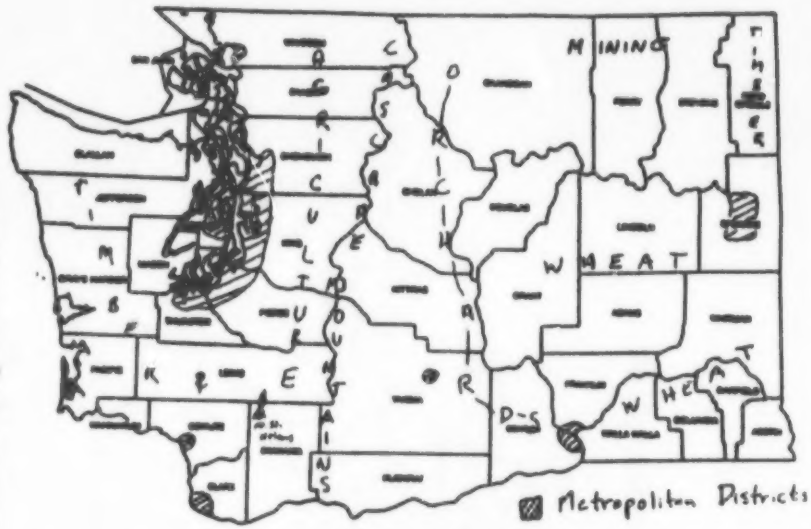
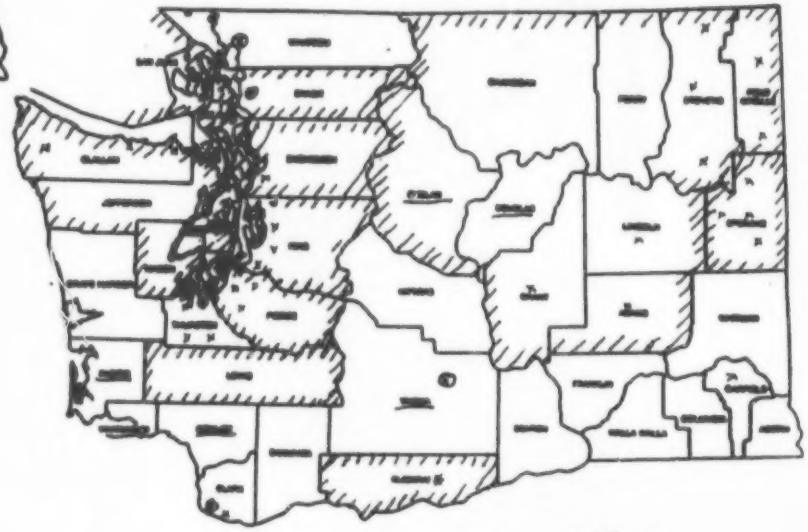


Figure 3 - Washington HHW Collection System



X - Permanent Collection Facility (circled if constant)

- Mobile System Service Areas (# if constant)

Name - Major Reliance on Collection Days

The Seattle-King County Plan

by

David V. Galvin
Senior Water Quality Planner
Municipality of Metropolitan Seattle (Metro)
Seattle, Washington

The Seattle metropolitan area has been addressing the issue of HHW management for over ten years. A cooperative spirit among local government agencies and private businesses has been a cornerstone of the Seattle-King County program.

Washington state law now requires that all local governments develop plans to address HHW and conditionally-exempt SQG hazardous wastes -- what the state calls "moderate risk wastes." The local agencies within King County (encompassing the City of Seattle, 30 suburban and rural cities around Seattle and unincorporated county) agreed early on to work together to develop a regional plan rather than have each jurisdiction do its own thing. The state assisted with grant funds for planning as well as guidelines for what to include in a plan. The Seattle-King County area includes 1.4 million people and between 30 and 50 thousand small businesses that are potential CESQGs.

We went through a lengthy, traditional planning process, including many opportunities for public and business involvement. We assessed the current situation and determined that there were over 6,000 tons of HHW entering the solid and sewerage wastestreams per year (plus twice that amount coming from CESQGs). We projected into the future that these volumes would increase to 8,000 tons per year of HHW by 2000 and 11,000 tons per year of HHW by 2010 if nothing was done to address these wastes. We attempted to project the effectiveness of a wide variety of potential program elements, both educational activities aimed at waste reduction and collection services aimed at efficient handling of wastes not able to be reduced or eliminated.

We produced a draft plan and draft EIS in February, 1989, that contained a range of alternative programs. After public review and comment, we then produced a recommended final program in August, 1989, that I will describe briefly here. This "final" plan has been subjected to further scrutiny and refinement as part of the elaborate adoption process necessary for all local jurisdictions to buy into the same program. I should note that we are not there yet -- the adoption process has taken more than a year, but we are on the verge of having a final plan adopted by all 31 cities, King County and Metro. Those of us who have been involved in the planning are frustrated by the delays but anxious to begin full implementation in 1991.

The "Local Hazardous Waste Management Plan for Seattle-King County" addresses both HHW and CESQGs. It contains six major components:

- HHW education,
- HHW collection and waste management,
- SQG education and technical assistance,
- SQG waste collection and management,
- Compliance (aimed primarily at SQGs), and
- Evaluation.

The HHW Education component contains a range of activities aimed at raising the public's awareness and moving the public to change buying, use and disposal behaviors over about a ten year period. Public outreach will take many forms, from routine utility bill inserts to moving displays to radio and television public service announcements. School programs will get HHW activities to kids and through them into homes. Development of information on alternative products will continue so that we have a comprehensive and sound data base to back up our recommendations to consumers. People in the Seattle area will not be able to escape encounters with HHW-related information and will over time modify their behaviors accordingly.

The HHW Collection component builds on existing programs in our area. We propose a network of six permanent collection facilities (modeled after the one existing permanent site operated by the City of Seattle) plus three mobile collection units (modeled after King County's wastemobile). In addition, special collection services will be explored for such high volume wastes as paints and used motor oil.

The Evaluation component will measure progress toward our goals. We will be tracking all activities and keeping detailed records of participation, waste volumes, costs, etc. In addition, surveys will assess changes in awareness and field sampling will measure changes in HHW entering the solid and liquid wastestreams.

The proposed programs will not come cheap. The budget for the first full year of implementation is $4.4 million, rising to $8.3 million by the fifth year; of that, $2.5 million in the first year and $4.9 million in the fifth year address HHW programs.

Financing will come from a combination of state grant sources plus a fee on garbage haulers and sewage treaters to be levied by the local boards of health.

In summary, the Seattle-King County Plan is ambitious and aimed at making a significant impact on both HHW and CESQG wastes in the local wastestreams and environment. It has taken three years to develop and represents a complex program involving a number of participating government agencies willing to cooperate toward a truly regional effort. Once fully underway in 1991 it will represent one of if not the best, most comprehensive programs in the country. We look forward to tackling the HHW issue in an ambitious way and to sharing our experiences with other programs throughout the country as we learn the most effective and efficient methods for addressing these wastes.

MODERATE RISK WASTE PLANNING IN RURAL WASHINGTON COUNTIES

Larry D. McCallum

The purpose of my presentation this morning is to discuss the planning process which has been developing over the past 2 years in the rural parts of Washington and profile the rural counties. I will focus on the demographics, economy, political infra-structure, and other elements which have been influential in shaping the rural planning process now and in the future. Local counties are currently developing mrw plans which will target waste reduction of hhw and small quantity generator waste over the next five years. The planning process for rural counties is somewhat unique as compared to urban areas of the state.

Classification of Rural Counties

I used some criteria for differentiating rural vs urban areas of the state. Criteria include:

a. total population<100,000
b. population density<100 persons/sq mi(fig.1)
C. area of harvested cropland<10%(fig 2)

Most of the counties met 2 out of 3 of these criteria. If they met at least 2, they were considered rural. As you can see, most of these counties occur on the East side of the state;20 as compared to 11). One county is in Idaho(Nez Perce) (fig.3)

Rural agricultural economics plays an important role in shaping the final plans for rural counties. Problem waste streams are an outgrowth of a highly diversified agricultural base, literally spanning the range of commodities from wheat and ranching to row crops.

Political Structure

The rural counties in Washington are governed by boards of county commissioners which are the executive branch of government and makes final decisions on budgets, plans, and almost all the mechanics of running the county. The planning process was set up so the county was the ultimate decision-maker on final plan implementation. It is interesting to note although these rural counties are characterized by having large numbers of small towns, generally widely scattered, there is a high degree of efficiency in "getting the word out" and for diverse ideas to be heard and acted upon, many times in a very expeditious fashion. Sometimes, it takes a long time for a plan to get moving, but once it's going, things get done and done quickly. One of the reasons for this is rural county officials wear "many hats" and know and can act on the issues.

Rural vs Urban Comparisons

What I would like to do now is compare rural areas of the state with

the urban areas using data gathered during the planning process on hhw and sqg waste streams. Of the total amount of waste generated state wide (82,000 tons per yr),52,000 tons is from sqg's and 30,000 tons from hhs. Rural sqg contributes approximately 16,900 tons and rural hh,7,000 tons per year. In rough figs, less than 1/2 is sqg and 1/3,hh. However, our studies show the average generation rate per hh or business is almost identical for both urban and rural areas;27 lbs/hh and 1500 lbs/sqg. It should be emphasized that an important factor in these waste volumes is missing for rural Washington. The surveys do not measure agricultural waste volumes for all of rural Washington. We know the volumes are significant; Yakima County did a survey and found in the neighborhood of 185 tons of stored waste on farms. This may be the tip of the iceberg for the remainder of the state and poses a real challenge for all of us involved in developing and implementing plans in rural counties.

The Existing Rural MRW Management System

Since the state planning process began there has been a strong movement by rural counties on the east side of the state to regionalize the planning effort by working jointly with neighboring counties. There are 4 bi-county and one tri-county plan currently being developed and adopted. The rationale for this approach is the relatively homogeneous agricultural land base, similarities in rural philosophies and lifestyles, and basic economies of scale. All of these factors have shaped the regional plans and will be influential as these plans are implemented.

Another factor which influenced the rural planning process was the existing solid waste management system; how it operates and the politics of sw collection and disposal. Many counties share these systems(eg) and by working together will develop a mrw collection and disposal system which serves the region as a whole. I also want to emphasize that rural counties have been active in mrw management with collection days and educational programs.

Future Planning for Rural Counties

As Bill discussed earlier, our Department is reviewing all plans with the goal of having review completed by the end of this year. After they they are approved, the counties need to start implementing the recommended programs by Dec. 31,1991.

The plans contain an interesting mixture of programs which when implemented will require a considerable amt. of resources to do the job right. One of the most interesting programs to be implemented will be the mobile collection of hhw in rural Washington. This method will grow especially in areas where the cost of transport is off-set by rural waste volumes. The total planning effort will take considerable commitment of resources. We estimate the cost of implementing all plans state-wide to be around $66.0m over the next five years. Rural counties;$11.0m. The real challenge, as I see it is finding the funds to assist local govts in the implementation process and continue to develop the current level of effort that Bill and I have observed as we work with these communities.

YAKIMA COUNTY

HAZARDOUS WASTE MANAGEMENT PLAN

Ron Pepper

1. INTRODUCTION

2. EXECUTIVE SUMMARY

3. THE PLANNING AREA

4. REGULATORY REVIEW

5. HAZARDOUS WASTE GENERATION IN YAKIMA COUNTY

6. SOLID AND HAZARDOUS WASTE MANAGEMENT IN YAKIMA COUNTY

7. IMPROVING HAZARDOUS WASTE MANAGEMENT IN YAKIMA COUNTY

8. RECOMMENDATIONS

MODERATE RISK WASTE SURVEYS

1) HOUSEHOLD SURVEY (TELEPHONE -200)

FINDINGS

- UNAWARE OF HAZARDS
- GENERATE APPROXIMATELY 2,682 TONS EACH YEAR
- WASTE OIL AND PAINTS LARGEST PERCENTAGE
- MAJORITY ENDS UP BURIED OR IN GROUND

2) COMMERCIAL WASTE SURVEY (1800/MAIL-OUT; 40% RETURN)

FINDINGS

- BUSINESSES WERE UNAWARE OF HAZARD
- BUSINESSES UNAWARE OF REGULATIONS IN REGARDS TO HANDLING STORING AND DISPOSAL
- GENERATE APPROXIMATELY 4,077 TONS EACH YEAR
- WASTE OIL, SOLVENTS, PLATING WASTES, PHOTOPROCESSING CHEMICALS AND PESTICIDES WERE LARGEST PERCENTAGES
- TOP THREE BUSINESSES
  - VEHICLE MAINTENANCE AND GAS STATIONS
  - MOTOR AND RAILROAD TRANSPORTATION
  - CONSTRUCTION

3) AGRICULTURE WASTE SURVEY (1000/MAIL-OUT; 30% RETURN)

FINDINGS

- APPROXIMATELY 185 TONS STORED ON PROPERTY
- MOST ARE ABANDONED PRODUCTS
- UNSAFE DISPOSAL PRACTICES

YAKIMA COUNTY PUBLIC WORKS
HOUSEHOLD HAZARDOUS WASTE
PROJECT SURVEY

DATE: _____
SITE: _____

1. What area do you live in? _____

_____

2. How did you hear about this service?

_____ Yakima Herald Republic
_____ Thrifty Nickel
_____ Penny Press
_____ Sunnyside Daily
_____ Valley Press
_____ TV
_____ Radio
_____ Friend/Word of Mouth
_____ Other (explain) _____

_____

3. How have you disposed of your hazardous wastes in the past?

_____ With the household garbage
_____ Dumped down the drain/toilet
_____ Did not dispose of, kept stored
_____ Other (explain) _____

_____

4. Would you like to see this project done again?

_____ Yes
_____ No

5. Would you use this service if a fee was charged?

_____ Yes
_____ No
_____ Depends on fee

6. How old is the oldest product you have brought here for disposal?

_____ 0 - 6 months old
_____ 6 - 1 year old
_____ 1 year - 5 year old
_____ over 5 years old

I certify that all wastes brought here today for proper disposal are household hazardous wastes.

Date: _____ Signed: _____

Address: _____

sw\mm12-23.vac

PLAN RECOMMENDATIONS

1) HAZARDOUS WASTE EDUCATION

- DEVELOPING AND PUBLICIZING INFORMATIONAL MATERIAL
- CONSIDER A WASTE INFORMATION NETWORK TRADE FAIR
- PROVIDE SPEAKERS FOR COMMUNITY AND BUSINESS GROUPS
- ESTABLISH AN EDUCATIONAL PROGRAM FOR SCHOOLS
- IMPLEMENT A "VOICE BOX" HOTLINE FOR PUBLIC INFORMATION

2) EDUCATION ON PROPER MANAGEMENT OF AGRICULTURAL CHEMICAL WASTE

- WASHINGTON STATE DEPARTMENT OF AGRICULTURE AND ECOLOGY AND WASHINGTON STATE UNIVERSITY COOPERATIVE EXTENSION CONTINUE IN EDUCATING FARMERS ON PROPER WASTE MANAGEMENT
- PROVIDE SPEAKERS TO LOCAL AGRICULTURAL ORGANIZATIONS
- PROVIDE AND DISTRIBUTE FLYERS ON BROCHURES ON AGRICULTURAL CHEMICAL WASTE MANAGEMENT
- PROVIDE INFORMATION ON PROPER MANAGEMENT OF MODERATE RISK WASTES GENERATED FROM FARM MACHINERY EQUIPMENT

3) COLLECTION OF HOUSEHOLD HAZARDOUS WASTE

- CONTINUE TO HOLD HOUSEHOLD HAZARDOUS WASTE TURN-IN DAYS
- FEASIBILITY STUDY TO BE DONE TO DETERMINE POTENTIAL LOCATIONS FOR A PERMANENT FACILITY
- IMPLEMENT A VOLUNTARY COLLECTION PROGRAM FOR SMALL "BUTTON TYPE" BATTERIES WITH LOCAL RETAILERS
- WASTE OIL, PAINTS AND AUTO BATTERY COLLECTION CONTINUE AT LANDFILLS

4) COLLECTION OF MODERATE RISK WASTE FROM BUSINESSES

- HOLD TWO COMMERCIAL COLLECTION EVENTS FOR SELECT BUSINESS GROUPS
- EVALUATE RESULTS AND DETERMINE NEED FOR ADDITIONAL EVENTS OR NEED OF PERMANENT FACILITY

5) AGRICULTURE CHEMICAL WASTE COLLECTION

- WASHINGTON STATE DEPARTMENT OF AGRICULTURE HAD ADDITIONAL "INSPECTION DAYS"

6) HEALTH AND SAFETY

- DEVELOP A MODERATE RISK WASTE PROGRAM FOR TRAINING OF PUBLIC EMPLOYEES ROUTINELY EXPOSED TO MODERATE RISK WASTE
- OFFER PRIVATE SOLID WASTE HAULERS OPPORTUNITY TO PARTICIPATE IN TRAINING PROGRAM OR USE OF MATERIALS

7) COMPLIANCE AND ENFORCEMENT

- UPGRADING OR PUTTING UP NEW SIGNS OF SOLID WASTE FACILITIES SPECIFYING PROPER WASTE DISPOSAL METHODS FOR MODERATE RISK WASTE
- HAND OUT FLYERS AND BROCHURES TO USERS OF THE LANDFILL FACILITIES
- IMPLEMENTING A TECHNICAL ASSISTANCE, INSPECTION AND ENFORCEMENT PROGRAM BY THE HEALTH DISTRICT
- DEVELOP ORDINANCE REGULATING MODERATE RISK WASTE

8) PROGRAM EVALUATION

- EVALUATE PROGRESS AND PROGRAMS
- ESTABLISH TECHNICAL REVIEW COMMITTEE
- PROGRESS REPORTS

HHW COLLECTIONS
COST PER PERSON

NO. OF DRUMS	YEAR	NO. OF TURN-INS	TOTAL COST	PARTICIPANTS	COST PER PARTICIPANTS
14	1986	1	$14,000.00	103	$110.00
21	1987	2	$17,651.62	195	$ 90.52
23	1988	9	$18,320.00	231	$ 80.00
54	1989	9	$33,675.01	426	$ 79.00
*110	1990	9	*$50,000.00	803	*$ 62.00

*ESTIMATES

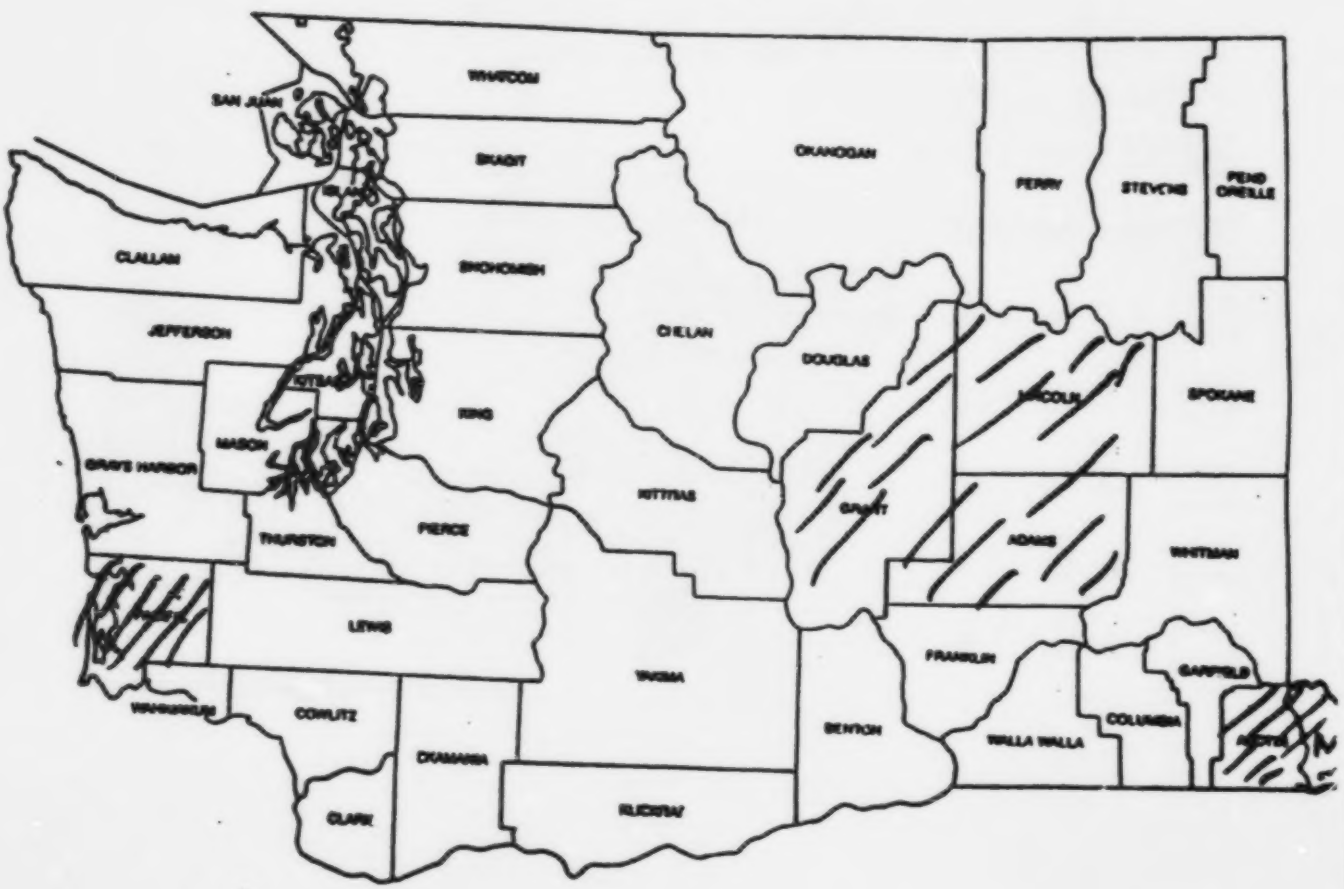
1989 HHW TURN-IN EXPENSES

LABOR	$ 3,053.35
ADVERTISING	$ 3,910.39
ER&R	$ 1,104.22
DISPOSAL	$16,200.00
PROFESSIONAL SERVICES AND SUPPLIES	$ 9,407.05
	$33,675.01

9) RECOMMENDATIONS FOR STATE ACTIONS

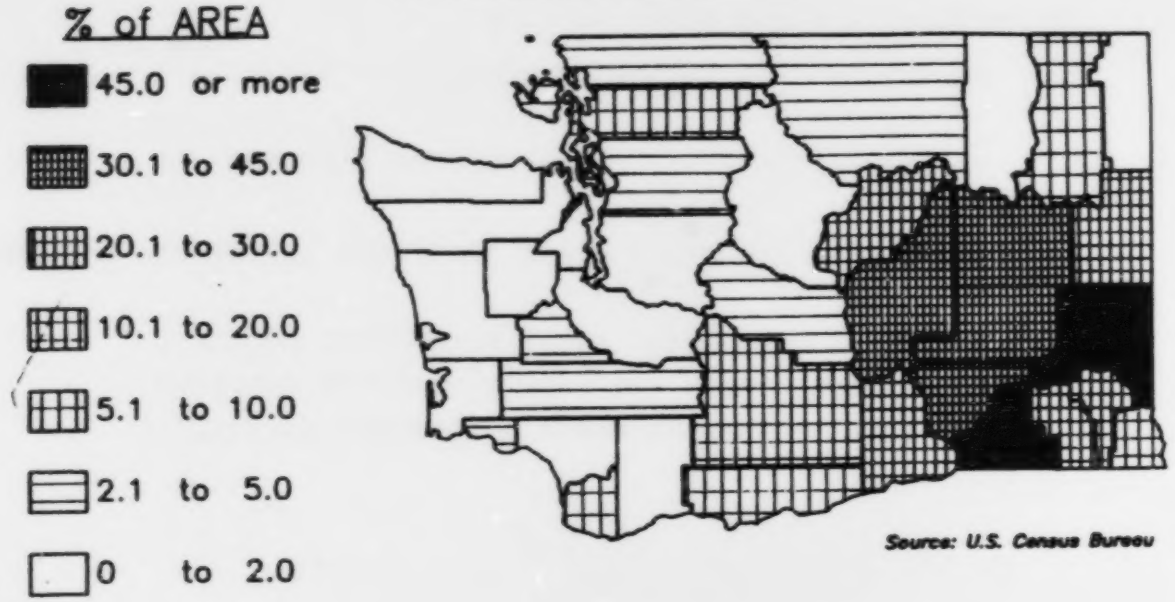
- REDUCTION OF HAZARDOUS MATERIALS IN PRODUCTS
- ENSURE ADEQUATE AND CLEAR PRODUCT LABELING
- EXPAND ITS EDUCATIONAL AND TECHNICAL ASSISTANCE PROGRAMS
- ASSIST IN DEVELOPING AND IMPLEMENTING MODERATE RISK WASTE HEALTH AND SAFETY TRAINING PROGRAMS AND LOCAL HAZARDOUS WASTE MANAGEMENT ACTIVITIES

Fig 3
Rural Counties in State



PERCENT OF AREA IN HARVESTED CROPLAND

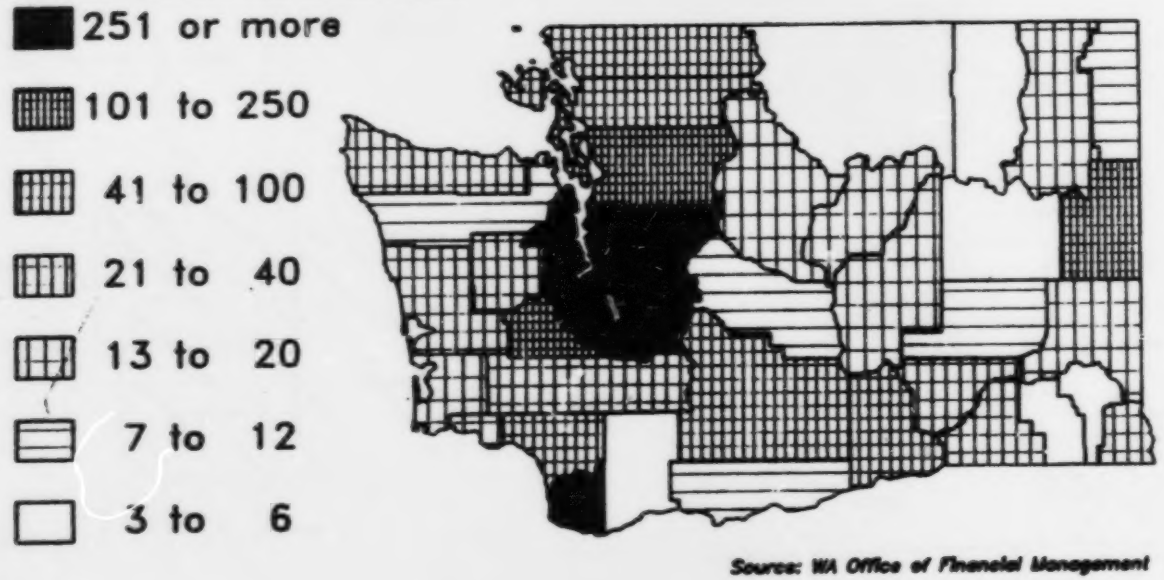
– 1982 Data By County –



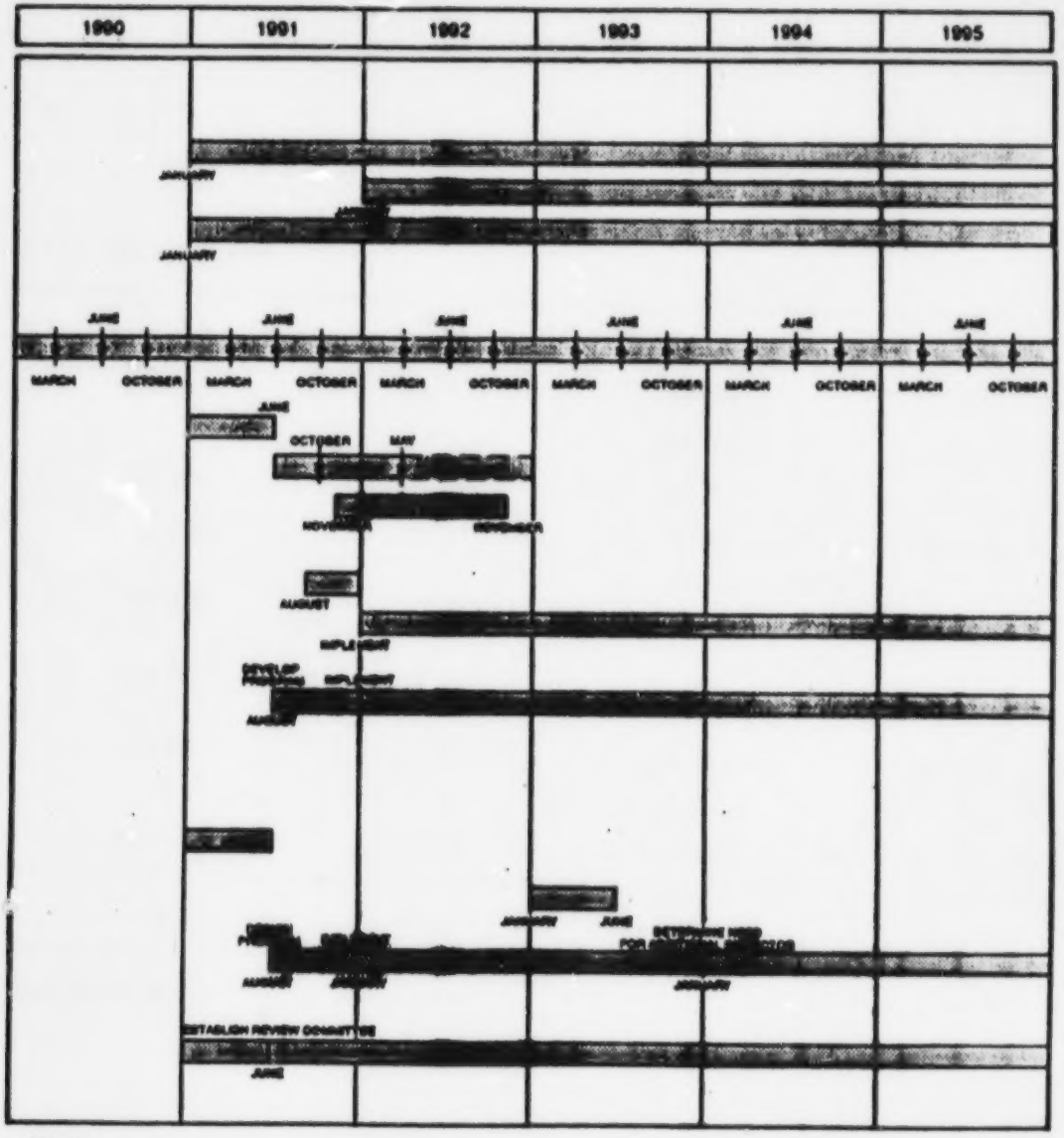
Source: U.S. Census Bureau

POPULATION DENSITY

– 1987 Data By County –



Source: WA Office of Financial Management



• Events

Figure 8-1.
Yakima County Hazardous Waste Management Plan Implementation Schedule

565

Table 8-1. Yakima County Hazardous Waste Management Plan five-year budget.

Program Component	1991[a]	1992[a]	1993[a]	1994[a]	1995[a]
Hazardous Waste Education	$72,936	$60,461	$62,888	$65,347	$67,974
Moderate Risk Waste Collection					
Household Hazardous Waste Turn-In Days	$57,907	$69,222	$82,800	$98,944	$118,682
Commercial Moderate Risk Waste Collection	$33,073	$37,340	--	--	--
Feasibility Study for Permanent Facility	$3,318	$17,370	--	--	--
"Button type" Battery Collection	$2,505	$4,462	$4,641	$7,072	$9,163
Health and Safety	$4,004	$4,164	$4,331	$4,501	$4,682
Compliance and Enforcement	--	$54,134	$56,306	$58,508	$60,861
Program Coordination and Evaluation	$10,010	$10,410	$10,828	$11,252	$11,704
Total Costs	$183,753	$257,572	$221,794	$245,624	$273,065

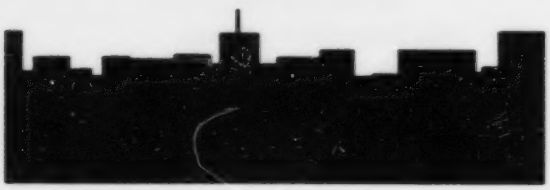
[a]Costs are increased by 4% each year to account for inflation.

Robert Axelrad

INDOOR AIR QUALITY

Indoor Air Division

U.S. Environmental Protection Agency

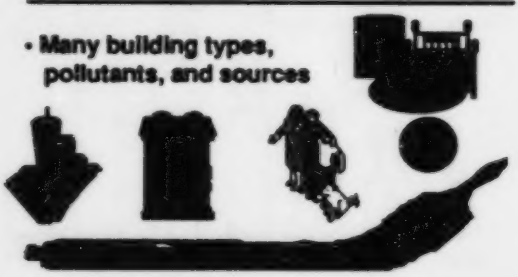


Why is Indoor Air Important?

- Indoor levels often higher than outdoors
  - 2-5 times higher for many pollutants
  - Up to 1000 times higher during and after use
- People spend app. 90% of time indoors
- Health effects: acute irritant reactions to cancer

Indoor Air Quality is a Complex Problem

- Many building types, pollutants, and sources



Indoor Air Quality is a Complex Problem

- Many confounding factors

Factors Affecting Occupant Perception of Indoor Air Quality

- Chemical contaminants
- Biological contaminants
- Ventilation
- Thermal comfort (temp/humidity)
- Odor
- Psycho-social factors
- Lighting / ergonomics / other factors

Indoor Air Quality is a Complex Problem

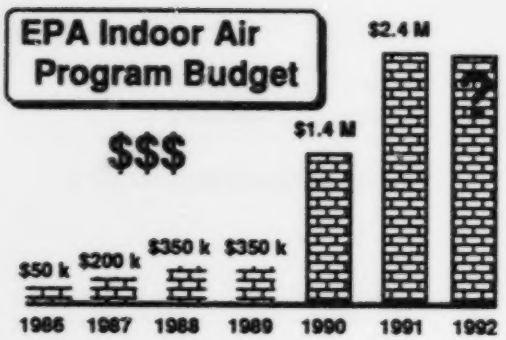
- Limited scientific understanding of many issues:
  - Mixtures
  - Low levels of pollutants

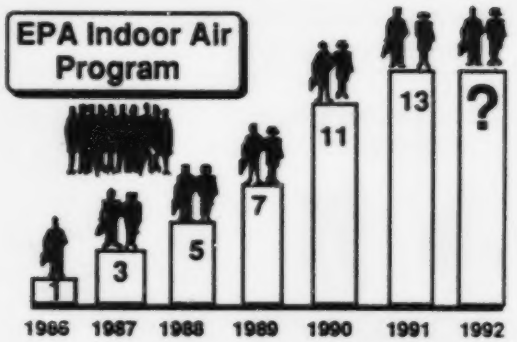
EPA and Indoor Air

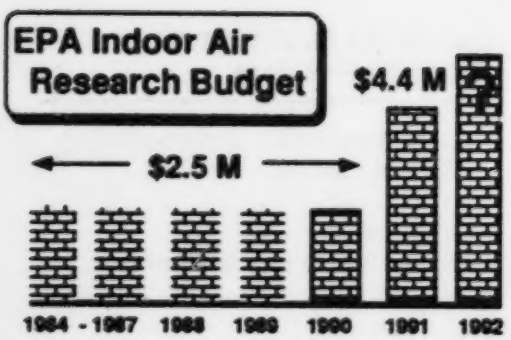
1970	Clean Air Act
Late 70's Early 80s	Asbestos, formaldehyde
1984	Congressional research$$
1985	Radon Action Program
1986	1st legislation on indoor air
1990	Senate Bill Passes

Comparing Risks to Set Environmental Priorities

- 1987 Comparative Risk Project: Indoor Air Ranked #4
- 1989 Regional Rankings Indoor Air Ranked #2
- 1990 Science Advisory Board Indoor Air Among Top 4







Large Buildings

Guidance Documents:

- Building Managers Problem-Solving Guide
- Prevention of Problems in Existing Buildings
- Architect & Engineers Design Guide

Pollutant/Source Program

Environmental Tobacco Smoke

- Health Effects of Passive Smoking: Lung Cancer in Adults and Respiratory Disorders in Children
- Guide to Workplace Smoking Policies

Residential Buildings

- The Inside Story (Consumers)
- New Home Construction Guide (Developers/Builders)

HHW & Indoor Air Quality

- Not just an issue of contaminated soil and ground-water
- You are exposed to many HHW during normal use & storage

HHW & Indoor Air Quality

Health Effects

- Little understanding of effects at levels found indoors
- Prudent to minimize exposure

HHW & Indoor Air Quality

Solutions

- Properly dispose of unused or little-used containers
- Support HHW collections

Schools

- Prev/Maintenance/Operation Guide
- IAQ/Radon Ventilation Program

Household Hazardous Wastes & Indoor Air Quality: Is there a Connection?

HHW & Indoor Air Quality

- High indoor air levels partly due to storage & use of consumer products:

  paints, solvents, cleansers, pesticide storage, dry-cleaned clothes, smoking, deodorizers, mothproofing, etc.
- Closed containers still emit VOCs

HHW & Indoor Air Quality

Solutions

- Buy paints, solvents, pesticides & cleansers in limited quantities
- Follow manufacturer's instructions
  - Avoid over-application
  - Ventilation critical

HOUSEHOLD HAZARDOUS WASTE AND INDOOR AIR QUALITY

(HHW & IAQ)

Presented at

U. S Environmental Protection Agency
Household Hazardous Waste Management Conference
November 5-7, 1990 San Francisco, California

by

Hal Levin
Hal Levin & Associates
Santa Cruz, California

CHART 1

HHW AND IAQ:

MANY COMMON PROBLEMS
AND
MANY COMMON SOLUTIONS

BUT

SOME TOUGH NEW PROBLEMS TO SOLVE

CHART 2

MOST MATERIALS AND PRODUCTS THAT BECOME
HHW MAY ALSO BE
SOURCES OF INDOOR AIR POLLUTION

- CLEANERS
- WAXES
- PAINTS
- OILS
- COSMETICS
- POLISHES
- STAINS
- SOLVENTS
- PESTICIDES
- BATTERIES
- HOBBY, ARTS & CRAFTS MATERIALS

CHART 3

THE BEST CONTROL FOR HHW AND FOR IAQ IS
SOURCE CONTROL

- ELIMINATION
- REDUCTION
- SUBSTITUTION
- ISOLATION

CHART 4

SOURCE CONTROL OF HHW CAN REDUCE
EXPOSURE TO SOME INDOOR AIR POLLUTANTS.
BUT THERE IS NO FREE LUNCH;
THERE WILL BE SUBSTANTIAL COSTS

NEED SAFE WAYS TO:

- CONTROL MICROORGANISMS
- PROTECT WOOD FROM DETERIORATION
- PROTECT BUILDINGS FROM MOISTURE ENTRY
- FASTEN FLOOR COVERING TO SUBSTRATE
- AND TO DISPOSE OF MATERIALS ALREADY IN COMMON USE OR IN PLACE

CHART 6

THE REAL COSTS OF

1. DISPOSING OF HOUSEHOLD HAZARDOUS WASTE PROPERLY
2. INDOOR AIR POLLUTION HEALTH AND ECONOMIC IMPACTS

HAVE NOT YET BEEN FULLY APPRECIATED.

WHEN THEY ARE,
THERE WILL BE CONSIDERABLY MORE WILLINGNESS TO SERIOUSLY ADDRESS SOURCE REDUCTION STRATEGIES.

CHART 7

AN AMBITIOUS (AND NECESSARY) PROPOSAL

1. LEVY A TAX ON GENERATORS OF HAZARDOUS MATERIALS PER UNIT PRODUCED BASED ON THEIR FAIR SHARE OF THE COST OF PROPER WASTE DISPOSAL.

2. USE FUNDS TO PAY THE COSTS OF LOCAL HHW AND SMALL GENERATOR DISPOSAL. THE COSTS OF PROPER DISPOSAL SHOULD BE INCORPORATED INTO THE COST OF THE PRODUCT.

3. FUND RESEARCH ON ALTERNATIVE PRODUCTS THAT RESULT IN LESS WASTE OR LESS DIFFICULT AND ENVIRONMENTALLY COSTLY DISPOSAL REQUIREMENTS.

Technical problems that must be addressed before reliable data will become available for such uses:

- **Standardization of reliable specimen acquisition procedures.**
- **Improvement of emissions testing procedures.**
- **Reducing cost of VOC sampling and analytical methods.**
- **Development of standardized quantification and reporting of total VOC concentrations or emissions.**
- **Increased understanding of the emissions process.**

VENTILATION AND CLIMATE CONTROL

Dilution by Outside Air Ventilation
- Outside Air Per Occupant (OA CFM/P)
- Outside Air Exchanges per Hour (OA ACH/H)
- Ventilation Based on Contaminant Source Strengths
- Direct Exhaust from Polluting Activity Spaces

Air Intake Locations
- Avoid Plumes from Known and Suspected Sources
- Avoid Standing Water and Cooling Tower Drift

Building Exhaust Locations
- Avoid Contamination of Ventilation Air Intake
- Increase Height and Distance from Air Intakes

Air Cleaning and Filtration
- Outside Air Meets Ambient Air Quality Standards:
  - Particles: Media, Electronic Filters
  - Gases: Chemisorption, Scrubbers
- Recirculated Air Meets Guidelines/Standards

Space Air Distribution
- Prevent/Eliminate "Dead Zones" and Stratification
- Deliver Ventilation to Occupant Breathing Zone
- Maintain Effective Pressurization Control
- Balanced Supply and Return Air Systems

Heat Recovery
- Energy Conserving Outside Air Ventilation
- Transfer Air for High Ventilation Rate Areas

Microbial Control
- Avoid Fleecy Materials in Ductwork
- Eliminate Standing Water

Standards Development
- Consolidate Comfort and Health Criteria
- Codify Guidelines as Minimum Requirements
- Base Ventilation on Contaminant Source Strengths

Useful mitigation measures include the following:

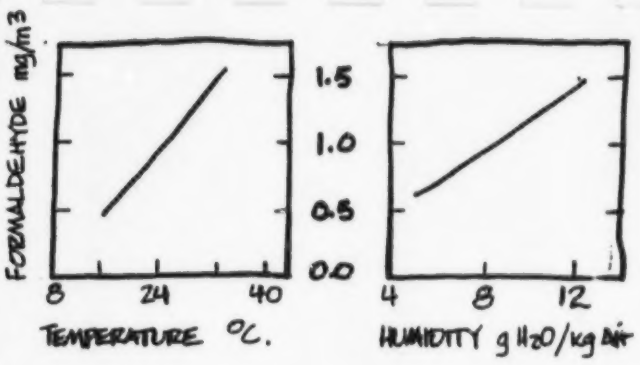
* Careful product selection based on knowledge of product performance.
* Product modification.
* Pre-treatment prior to use in the building.
* Changes in installation procedures.
* Changes in ventilation system operating procedures.
* Treatment in-situ through the bake-out process.
* The use of air cleaning technology to control air concentrations of emissions.

EXAMPLES OF TRADE-OFFS BASED ON EMISSIONS TEST RESULTS

* High initial emissions which decay rapidly and reach a low, stable long-term emission rate versus products with lower initial rates but very slow decay rates.

* Products which emit known carcinogens or teratogens at extremely low levels for long time periods versus products emiting larger concentrations of irritants or odorants.

* Products which dry very slowly (low emission decay rates) containing low levels of carcinogens versus products which dry quickly containing carcinogens, toxins, and irritants.



FORMALDEHYDE EMISSIONS FROM PARTICLEBOARD

Current and future needs:

1. **Improved understanding of health effects of individual VOC and of complex mixtures.**
2. **Standardized procedures for product testing, reporting, and evaluating.**
3. **Reliable test auditing procedures:**
   - **Lab certification programs?**
   - **Random checking?**
   - **Product certification?**
   - **Quality control for products to assure conformance to test specimen performance.**

SOURCES OF INDOOR POLLUTION

OUTDOORS:	Motor vehicles Fuel combustion Industrial by-products soil Plants, animals Photochemical reactions
INDOORS:	Tobacco smoking Fuel combustion Cooking Soil gas Water vaporization Cooking Consumer products Metabolism Human activity Building materials Furnishings

Major Indoor Pollutants / Sources

Tobacco smoke	Cigarettes
Formaldehyde	Plywood, particleboard, adhesives
Radon	Soil gas, building materials
Particles	Metabolic activity, combustion
Carbon monoxide	Fuel burning
Carbon dioxide	Metabolism, combustion
Sulfur oxides	Fuel combustion
Nitrous oxides	Fuel burning
Asbestos, synth. fibers	Building materials
Organic substances	Adhesives, solvents, cooking, cosmetics
Microorganisms	People, animals, plants
Allergens	House dust, animal dander, insect parts
Mercury	Fungicides, paints

Materials that should be evaluated carefully during the design, selection and specification process are listed below.

**** Coatings: paints, varnishes, waxes.**
These materials go on wet; by design they contain volatile components expected to enter the air. There are diverse products available for each application, and tests have shown that their emissions vary significantly.

**** Flooring or wall covering materials made of plastics, fibers, or fabric**
These products may change considerably during the early period of their life. Characterizing their emissions and the decay rate of emissions can be useful in planning installation and treatment procedures.

**** Adhesives, caulks, fillers, gaskets, sealants.**
These materials are often among the most important sources of indoor air contaminants. There are large differences among similar products, so testing can be useful in identifying low-emitting, less toxic alternatives.

**** Furniture or furnishings with substantial amounts of pressed wood o. fabrics.**
Pressed wood products still are common sources of formaldehyde as well as other VOC.

**** Non-metallic materials used in ductwork of ventilation systems.**
Of particular concern are duct liners for sound or acoustic purposes. They can emit materials originally in them or adsorbed onto their considerable surface areas.

**** Office machines and supplies (e.g., coated papers).**

**** Maintenance materials (e.g., floor waxes, rest room odorizers).**

A standard emission test report should:

* Identify and report emission factors for the five major organic compoun emitted (i.e., the five compounds with the largest emission factors).

* Identify the presence (or absence) of and report emission factors for any specified compounds (for example, 4-PC from carpet or formaldehyde furniture; if absence is claimed, the detection limit should be reported.

* Report emission factors for total measured organic compounds, in units toluene equivalents.

* Report emission factors as milligrams/hour per m^2 for surface materials coatings; milligrams/hour per kg for sealants and adhesives; and milligrams/hour per unit for furniture, machines, and other items.

* Report emission factors at three "ages" of the product:
  - for coatings, adhesives, and caulks: approximately 1, 10, and 100 hours application to a surface;
  - for solid materials, approximately 0-1, 10, and 50 days after production

* Report ozone emission rates for office machines in units of milligrams/h

* Report chamber testing conditions (temperature, air exchange rate, hum product loading), and storage and handling procedures.

EXHIBIT A: MATERIALS EVALUATION SHEET

CRITERIA (Weighted):	SCORE High 3	Med 2	Low 1	High Score Factors	Weight Factor	Total Score
1. Product use:						
• The total amount of the product or material used	.....			Large quantity	9	.....
• The location of its use in relation to occupants	.....			Close proximity	6	.....
• The location of its use in relation to the air flow in the occupied zone and in the HVAC system	.....			High airflow	6	.....
2. Chemical emissions' health effects:						
• Are the emitted chemicals known irritants, odorants, or toxins?	.....			Low threshold	9	.....
• Are there any carcinogens, mutagens, teratogens (substances that cause birth defects), or fetotoxins (substances with adverse effects on an unborn fetus)?	.....			Yes	9	.....
• Are there any chemicals known to damage immune systems?	.....			Yes	7	.....
• How potent are the chemicals? Are the levels found in buildings or likely to result from the use of the product near or above the threshold for the adverse effects?	.....			Low threshold	9	.....
3. Source strength and emissions characteristics:						
• What are the emissions rates for the product?	.....			Large	9	.....
• Do they change slowly or rapidly after installation in the building?	.....			Slowly	6	.....
4. Installation and curing options:						
• Does the product require special ventilation during installation to protect installers?	.....			Yes	4	.....
• Can special ventilation during installation eliminate the majority of the residues prior to occupancy of the building?	.....			No	6	.....
5. Alternate products:						
• Are there similar products with better ratings on categories 1 - 3 above.	.....			Yes	2	.....
6. Material dynamic characteristics:						
• Does the product have a large surface area which can adsorb and re-release large quantities of VOC?	.....			Yes	3	.....
• Is the product hygroscopic or likely to support microbial growth?	.....			Yes	3	.....
7. Maintenance requirements:						
• Does the product require maintenance involving frequent or large quantity applications of VOC?	.....			Yes	3	.....

Future Issues Needing Resolution

By Dana Duxbury

Its clear from the previous panels that there is an inordinate amount of work needed to evaluate products and communicate this information to the public. This information is essential if the public is going to know the constituents in a product, if they are going to know how to safely use and how to manage it once it becomes a waste. There is a serious lack of information at the moment about many products. We need to use Consumer Product Safety Commission releases of information, additions to the RCRA reauthorization process. We heard a lot about life-cycle analysis — we need to compare and contrast products; it is not enough to just have a label saying what is in a product. Then we also need to have a way of insuring that the public has that information.

It is also clear that these programs need money. Where is the money going to come from — internalizing it in the cost of the product makes a cost that the consumer will bear — industry won't fund it, they will pass it on — but this is fairer than having the taxpayer pay as currently happens. There may be many vehicles to seeing that we include the cost of managing the product as a waste in the original purchase cost. Dr. Vogel would put a deposit on the product which would insure it coming back. He would add it to a management cost included as part of the price for a product. If the consumer has no incentive to bring it back it won't be happen. Creative funding options are being looked at by people cross the country but mostly HHWM is paid for out of general revenues at the local level. We may do it out of tipping fees or through wastewater management. We do need in the near future to get it internalized — the public can be a source of support in this effort.

We also need to find ways to reduce the cost of the programs — and not by reducing participation. We can make consumers more careful consumers; alternatives do offer options and the public needs to be sensitized. We can reduce the amount of waste as result of current purchases — there are some unavoidables like motor oil and car batteries — and then there is all of the stored wastes from those who have still not yet participated. Hopefully amounts per participant will go down as purchasing habits change. We also can hope for more cost effective management of wastes — sorting (to avoid contamination from small amounts of highly toxic or hazardous materials), recycling. Careful attention must also be paid and investigation made of contractors and where and how wastes will be managed.

Source (toxicity reduction): we must keep the full court press on the manufacturers to let them know that we want the toxic constituents removed. Education is an important part of all comprehensive programs.

Future Issues Needing Resolution -- II

by

David V. Galvin
Senior Water Quality Planner
Municipality of Metropolitan Seattle (Metro)
Seattle, Washington

In addition to the issues enumerated by Dana Duxbury, the following are also important to focus on as the HHWM movement matures:

• CESQGs -- The conditionally-exempt small quantity generators are the businesses that produce relatively small amounts of hazardous waste under the 220-pounds-per-month threshold of federal and most state regulations. Our data in Seattle indicate that these wastes are twice the tonnage of HHW in our local wastestreams. These CESQG wastes are slipping through the cracks in programs throughout the country. Since they are in many ways similar to HHW, they should be addressed in complementary or parallel programs. It is time for our HHWM programs to broaden their outlook to encompass all small quantity, generally unregulated hazardous wastes such as the CESQGs.

• Specific Waste Streams -- As is evident from the attention paid them at this conference, there are some categories of HHW that deserve special attention, either because of their volumes, relative ease or difficulty in handling, or unique properties. Three that I will highlight are:

-- paints, due to their volumes and potential to be recycled or otherwise managed separately from other HHW;

-- batteries, due to the unique heavy metal content of some types and attempts to collect them separately from other HHW for potential recycling; and

-- used motor oil, due to volumes generated and opportunities to recycle separate from other HHW.

• Maximizing Participation -- Most HHW programs throughout the country have seen participation rates in the one to five percent range of the population being served. If we are serious about our purpose in HHWM, then we have got to do better than that. We need to build programs that reach a majority of the population and that result in significant amounts of wastes collected for safe handling and significant changes in the way people behave. This won't be cheap or easy, but will be necessary if we really want to make a difference.

• Evaluation -- It is time for us all to seriously assess the effectiveness of our efforts and to gather truly meaningful and comparable national statistics on our programs. Evaluation is an essential step for all programs to measure progress relative to the goals established. It is also important to compare and contrast different programs in order to learn in a meaningful way what is working well and what refinements offer the best opportunities for effectiveness and efficiencies. Some attempt at standardized reporting of data about programs is necessary in order to accomplish this at the national level.

Remarks of Laura Yoshii
Deputy Director, Hazardous Waste Management Division
U.S. EPA Region 9

I am pleased to have the opportunity to provide a few closing remarks. I'd like to share some thoughts, regarding household hazardous waste, from a federal perspective.

Before I begin my remarks, I'd like to take a moment to thank all of you who have contributed to this successful conference, especially Dana Duxbury and her Associates who organized this conference and the speakers who were willing to share their knowledge and experience.

Household hazardous waste, from a federal perspective, requires a different approach than the traditional command/control, end-of-pipe regulatory approach.

As you know, most federal hazardous waste laws specifically exclude household hazardous waste from regulation. This is not because we do not recognize the public health and environmental threats associated with household hazardous waste but because we question whether the traditional regulatory approach is the most appropriate or effective way to deal with the problem.

Let me elaborate on some of the reasons why a different approach is worth considering:

1) The number of individuals that contribute to the household hazardous waste problem is enormous. The traditional regulatory enforcement approach would simply be unworkable.

2) To demand that individuals comply with stringent disposal regulations would be unreasonable and impractical, given the costs that would be associated with compliance.

Recognizing these realities, EPA is promoting a different approach for dealing with household hazardous waste and other environmental problems which involves many individual sources of pollution. The different approach includes greater emphasis on:

1) <u>Pollution Prevention</u> - The idea here is to prevent the amount of pollution generated in the first place by encouraging source reduction. This idea is not new to you; in looking at the agenda for this conference it is clear that much is already being done in this area

2) to implement this there is also greater emphasis on education as a means to help change behavior. Relying solely on a command and control enforcement approach is not enough to do the job.

Succeeding with this different approach presents an enormous challenge because it requires that we think and act differently, but it also provides tremendous opportunity for creativity and innovation. It is also an opportunity to engage more people in resolving environmental problems, especially at the local level where people are closest to the problem. The importance of the role of State and local groups is already evidenced by successful projects that have been talked about at this conference. For example:

- o education programs in schools and communities in Minnesota that can adapt to specific circumstances while stressing the message of toxicity reduction
- o comprehensive model community efforts in Washington State involving everything from store coupons used for less-toxic products to a toxic tour of the mayor's house
- o the League of Women's Voters video presentations describing how to avoid using hazardous products and how to dispose of the waste if you must use these products
- o non-hazardous pest control methods ranging from copper barriers to goats
- o and may others.

Over the past 5 to 10 years, collection programs have also played a key role in dealing with household hazardous waste. They have provided a sensible way to allow for proper disposal of this special category of hazardous waste. By going beyond the requirements of federal law, collection operators address concerns about disposal of these substances within the municipal solid waste facilities and reduce the likelihood that they could become environmental problems.

EPA supports and promotes collection programs for other reasons as well. While some collection programs actually begin because of citizens' desire for a safe means to dispose of what

they know is hazardous waste, many people are not aware that the waste they generate is hazardous until the outreach entailed in a collection effort informs them of that fact. By providing a safe disposal option, collection programs limit the amount of household hazardous waste that is dumped indiscriminately or dumped down a drain, adversely impacting a publicly-owned treatment works. Safety hazards to both sanitation workers and individuals in the community at large are reduced by safely disposing of hazardous waste that has accumulated in the home.

On a less glamourous level, there is one other area that requires greater attention, data collection. Within the EPA, the Office of Research and Development is beginning to focus more of our risk reduction efforts to consumer products. In other organizations, measurement of the toxics households contribute to the water treatment system continues, and the results show that a surprising amount of heavy metals and other contaminants come from households. Beyond this important work, we need to work carefully to quantify the results of our source reduction programs. By measuring the amount of hazardous waste diverted from the waste stream through these efforts, we arm ourselves with a powerful tool to convince skeptics of the usefulness and cost effectiveness of our educational and source reduction programs.

I hope these brief remarks assist you in understanding the federal perspective and the different approaches that we are trying to promote. Again these areas are: pollution prevention, education, greater community involvement, and measurements of environmental results. Of course these approaches are not unique to EPA; many of your commendable efforts to date have focused on these areas.

I would like to encourage you to continue these efforts. The role you play is critical. You are in essence change agents in a phonemenal cultural charge process to raise individual awareness to reduce pollution. I hope you leave this conference with more ideas for effecting this change.

Thank you for this opportunity to share some thoughts and for your participation in this conference. I wish you well as you continue your work in this area.

THE HOUSEHOLD HAZARDOUS WASTE GRANT PROGRAM

Presented at EPA Conference on Household
Hazardous Waste Management
November 7, 1990 - San Francisco, CA

Anna Ward

Assembly Bill 2448 enacted the Solid Waste Disposal Site Hazard Reduction Act of 1987. One of the mandates of this legislation is for the California Integrated Waste Management Board (Board) to make grants for household hazardous waste (HHW) collection systems and waste control and enforcement programs to prevent the disposal of hazardous waste in solid waste disposal sites.

Through this legislation the State Board of Equalization, commencing this year, collects an annual fee from every solid waste landfill operator required to have a solid waste facilities permit in California. The amount each landfill operator pays is determined by the amount of solid waste disposed in the operator's landfill each year. The total fees collected each year, $20,000,000, is deposited into the Solid Waste Disposal Site Cleanup and Maintenance Account. Twenty percent of the fees or $4,000,000 is then available for the HHW grant program each year.

Eligibility

Only California cities, counties and local agencies responsible for waste management are eligible to apply for grants. There is no requirement that a city or county must operate its own landfill in order to be eligible for a grant.

Household hazardous waste programs eligible for grant awards include, but are not limited to, the following types of programs: load checking programs, collection programs which include periodic, permanent, mobile or residential pick-up services, waste control and enforcement programs, educational programs, and/or other program activities incorporating reuse, reduction, or recycling of hazardous waste and household hazardous waste.

Types of Grants

There are two types of grants, non-discretionary and discretionary. The non-discretionary grant is an award of funds to a jurisdiction which had 1) generated fees into the Account in the calendar year (1989) prior to the grant application, and 2) implemented a household hazardous waste program in the fiscal year prior to the grant application (1989/90).

Funding for the discretionary grant is divided into two parts. First, the Board will award funds to individual jurisdictions based upon how well an applicant's proposed HHW program addresses the grant elements specified in Title 14, California Code of Regulations, Article 2.2, sections 18533 and 18533.1. The other part of the discretionary grant further reimburses programs which had received funds in the same grant year from a non-discretionary grant program or had been eligible to receive funds but had not applied for a non-discretionary grant.

GRANT AMOUNT

The amount a non-discretionary grant recipient may receive will either be a reimbursement for the cost of its HHW program or for an amount equal to 20 percent of the fees generated by the applicant into the Account during the preceding calendar year, whichever is less.

The discretionary grant is totally dependent upon funds remaining in the Account after all non-discretionary grants have been awarded. In any event, the Board may not award a discretionary grant to an eligible jurisdiction in excess of $120,000 for any individual applicant.

NON-DISCRETIONARY GRANT

In the interest of time and since we are nearing the end of the application period for the non-discretionary grant, I will focus on this part of the grant program today. The application period begins, per regulation, the first business day in July of each grant year until 4:00 p.m. on the last Friday in September. Due to the delay in finalizing the regulations, the application period has been changed for this year only. The application period commenced September 7, and will end 4:00 p.m. November 30, 1990.

THE GRANT PROGRAM AT THIS TIME

The Board is now accepting and reviewing early applications and will continue to review all applications, requesting any additional information necessary to ensure an application is complete. After the application deadline, the amount each applicant will be eligible to receive will be determined, taking into account the number of applicants who had applied from each county and the amount of solid waste which was disposed of in each jurisdiction. Staff will make funding recommendations to the Board for their consideration at the February 1991 Board meeting. Notices of the agenda will be sent to all applicants. All applicants will be notified of the Board's action and the status of their application. It is anticipated checks will be

issued approximately 4-6 weeks after the Board's actions; however, this may vary depending on the administrative processing time required by the agencies issuing the checks. Hopefully, all grant recipients will receive their reimbursement by the end of April 1990.

TIPS ON COMPLETING AN APPLICATION

As a result of this first non-discretionary grant application period a number of questions have arisen I will selectively address at this time.

o In determining the amount of solid waste landfilled, count only the solid waste landfilled in permitted landfills.

o The State Board of Equalization (SBE) per ton fee amount is $.50 per ton based upon the amount of solid waste landfilled for calendar year 1989. The fee amount will vary from year to year depending upon how much solid waste is landfilled within the state. If less solid waste is landfilled, the landfill operators will pay more per ton to the SBE to reach the mandated $20,000,000 each year to go into the Account.

o Reimbursement for non-discretionary grants is for fiscal year July 1989 through June 1990. Through programs have been conducted prior to this time period, they are ineligible for funding as the grant program was not in effect.

o A jurisdiction receiving a non-discretionary grant is eligible to apply for a proposed discretionary grant as well as a second discretionary grant to further reimburse an implemented program. This further reimbursement applicant, however, is a lower priority than the proposal applicant.

o The sample budget does not have to look the same as the sample included in the instructions, but the budget report submitted must address all items listed in the sample.

o Only the direct costs of running a program can be included in this budget. Indirect and overhead costs are not to be included.

o The percentage of HHW traditionally landfilled from your solid waste stream may be unknown to your jurisdiction this year so, even though your city or county is required to conduct a waste characterization we know that many have not been completed at this time. So for the on-discretionary grant application, simply provide us with the history of your HHW program.

o You must include written documentation from your county on the amount of solid waste landfilled for the county. You will also need to obtain from the county the source(s) of the figures they give you.

In conclusion, read the regulations and answer all the required questions in the Contents of the Grant Application.

Lastly, a final note on the discretionary grant application - it will available the last week in November. Again, the submittal period is December 7, 1990 through February 22, 1991. All applications will be reviewed and funding recommendations will be made at the Board's April meeting. All applicants will receive notification of the meeting and of the Board action. Those jurisdictions receiving a grant award will be sent a grant agreement which must be signed as soon as possible to encumber the funds. Although the Board will award the grant funds by June 30, 1991, the actual payment of funds may occur later, depending on when the program is implemented. Funds will be disbursed either as an advance or as a reimbursement, to be determined on a case-by-case basis. Ten percent of the grant amount will be held in retention until the Board staff receives and approves the final report.

Then, on the first business day in July 1991 a new grant year begins for the non-discretionary grant program for fiscal year 1990-91.

For copies of regulations and/or copies of the discretionary grant application, call Anna Ward at 916 322-1440 or Sharron Leaon at 916 322-8750.

HHW Component of Source Reduction & Recycling

H. Fernando Berton

INTRODUCTION

Assembly Bill 939, Chapter 1095, Statutes of 1989, requires each city and county to prepare a Source Reduction and Recycling Element (SRR Element). Each SRR Element must include, but is not limited to, all of the following components:

1. Waste Characterization
2. Source Reduction
3. Recycling
4. Composting
5. Solid Waste Facility Capacity
6. Education and Public Information
7. Funding
8. Special Waste
9. Household Hazardous Waste

The SRR Element must be prepared and adopted by July 1, 1991 and is to be included in the Countywide Integrated Waste Management Plan that is to be submitted to the California Integrated Waste Management Board (Board) in accordance with the schedule set forth in Chapter 6 (commencing with Section 41780, Public Resources Code).

Recently, legislation was signed by the Governor (Assembly Bill 2707, Chapter 1406, Statutes of 1990) which deletes the inclusion of the HHW Component in the SRR Element. Instead, a city and county must submit a separate HHW Element along with the Source Reduction and Recycling Element. The existing regulations for the SSR Element, which specifically refers to the HHW Component, must be amended to reflect the legislative changes. Although Assembly Bill 2707 requires a separate HHW Element, the statutory requirements of the contents of the HHW Component have not changed. With this in mind, the amendments to the SRR Element regulations should not be significant in nature.

Throughout this paper the HHW Component/Element will be referred to as the HHW Component. The following information is designed to assist a city or county in drafting their HHW Element.

HHW COMPONENT OBJECTIVES

Each jurisdiction's HHW Component must include specific objectives to reduce or eliminate the disposal of HHW at solid waste facilities. Knowing that HHW is considered a hazardous waste in California and that hazardous waste cannot be disposed of in non-hazardous solid waste facilities, the only real objective would be to prevent or eliminate the disposal of HHW at these facilities. In addition, one of the objectives should be to recycle as much HHW as possible such as latex paint, used oil, lead-acid batteries, etc.

Each jurisdiction's objectives for the HHW Component must be based upon the Solid Waste Generation Study, conducted pursuant to Title 14, California Code of Regulations (CCR), section 18722.

DESCRIPTION OF EXISTING CONDITIONS

The HHW Component must include a description of the existing HHW collection program, if any. Assuming a jurisdiction does have an HHW collection program, the description must explain, in detail, the current methods for source reduction, recycling, collection, treatment, and disposal. In addition, the jurisdiction's description must include the types and quantities of HHW that are source reduced, collected, recycled, treated and/or disposed of through their existing program. The categories of HHW that are to be included in the description are those contained in form CIWMB-303 (1/90) which is attached as Attachment A.

Although not required by regulation, a description of any public outreach programs and funding sources should be included so the Board is aware of all conditions affecting a city's or county's HHW collection program.

If there is no collection program, an estimate of how much HHW is being illegally disposed of due to the lack of a collection program should be included in the description. This information may be obtained from the Solid Waste Generation Study required by 14 CCR, section 18722.

There are several HHW collection programs throughout the state that provide services for a region. One example are the cities of Fremont, Union City, and Newark in Alameda County. These cities have a joint agreement to share responsibilities for any HHW collection programs in this tri-city area. Another example is the Ventura Regional Sanitation District (District). In this case, the District provides collection services for the member cities of the District. In terms of describing the existing collection program, each city or county in a regional program must include a description of the program in which they participate.

EVALUATION OF HHW PROGRAM ALTERNATIVES

For cities and counties who currently have no HHW collection program, several program alternatives must be evaluated and considered. These alternatives include, but are not limited to the following:

a) Collection systems such as one-day collection events; permanent HHW drop-off sites at all new and existing solid waste facilities and at all new or existing off-

site, multi-user hazardous waste treatment, storage, and disposal facilities; mobile HHW collection services; and local efforts to encourage the formation of privately or publicly operated fee-for-service, door-to-door, or curbside HHW collection program.

b) HHW monitoring programs such as load-checking programs at all solid waste facilities.

c) HHW recycling programs for waste oil, paints, batteries, etc.

d) Public information and education efforts to be used in conjunction with HHW collection and recycling programs to effectuate the use of safer substitutes.

Each alternative listed above must be evaluated in terms of the following criteria and any other local considerations:

a) Effectiveness in reducing the amount of HHW ente ing a solid waste facility.

b) The environmental impacts created by the alternatives considered.

c) The ability to accommodate changing ecomonic, technological, and social conditions.

d) Whether the alternatives can be implemented in the short-term (1991-1995) and medium-term (1996-2000) planning periods.

e) The need for expanding existing facilities or constructing new facilities to support implementation of the alternative.

f) A discussion of the consistency of each alternative with applicable local policies, plans, and ordinances.

g) A description of any institutional barriers regarding implementation of each alternative.

h) An estimate of the costs related to the implementation of each alternative for the short-term and medium-term periods.

i) A discussion of the end-uses of diverted from solid waste facilities through implementation of each alternative.

SELECTION OF HHW PROGRAM

After all HHW program alternatives have been evaluated and a decision of the type of program to be implemented has been made, the HHW Component must include a discussion of each diversion alternative selected and reasons for selecting that alternative. In addition, the following information about the selected program must be included:

a) A description of the proposed methods for handling and disposal which may be necessary to implement the selected program and an identification of the types and quantities of HHW anticipated to be collected, recycled, and/or disposed of through the selected program.

b) A description of recycling and reuse efforts that will be used in conjunction with the selected HHW program and anticipated end-uses of the material.

c) A description of proposed public education programs specific to HHW.

d) A description of any facilities that must be expanded or constructed to support implementation of the selected program and a description of implementation activities for proposed cooperative and/or multi-jurisdictional HHW programs.

IMPLEMENTATION OF HHW PROGRAM

The jurisdiction must describe how they intend to implement the HHW program that was selected. The description must include the following:

a) An identification of government agencies and division within these agencies, organizations, and/or persons that are responsible for the implementation of the selected program.

b) The tasks necessary to implement the selected program

c) A short-term and medium-term implementation schedule which addresses each task identified in (b) above.

d) An identification of known program implementation costs, including public and private costs, revenues, and revenue sources necessary for implementation of the selected program.

To facilitate the implementation of the selected program, the local jurisdiction may use program guidelines and technical assistance provided by the Board .

AFFECTS OF ASSEMBLY BILL 2707

As stated earlier, Assembly Bill (AB) 2707 (Chapter 1406, Statutes of 1990), deletes the inclusion of the HHW Component in the SRR Element and instead requires a separate HHW Element. Each city must prepare, adopt, and submit an HHW Element for their jurisdiction on or before July 1, 1991 to the county in which the city is located. In addition, each county must prepare an HHW element for the unincorporated areas by July 1, 1991.

In preparing a City HHW Element and County HHW Element, components of the hazardous waste management plan prepared pursuant to Health and Safety Code Section 25135.7(c) and 25135.1, respectively, may be used if those hazardous waste management plans meets the requirements of AB 2707.

After the Board receives a city or county HHW Element, the Board has 120 days to approve or disapprove the Element. The Board may provide an exemption if a city or county demonstrates, and the Board concurs, that compliance with the requirements of the HHW Element is not feasible due to the small geographic size of the city or county and the small quantity of waste generated within the respective jurisdiction. Less comprehensive alternatives may be established the Board to ensure compliance with the requirements of the law.

CONCLUSION

With the population of California increasing at a dramatic rate, the potential for HHW to enter solid waste landfills and possibly contaminate the environment increases as well. The need to plan for and to provide an option for disposal becomes even more important. The City and County HHW Element is designed to be that planning and implementation tool to prevent illegal disposal of HHW and to provide a safe disposal option for the populace of California.

State of California — California Integrated Waste Management Board

HOUSEHOLD HAZARDOUS WASTE COLLECTION INFORMATION

CIWMB-303 (1/90)

Name of Local Agency: Phone:

Address: City: County: State: Zip:

(Please Use Applicable Units of Measurement)

Waste Category	Gallons	Pounds	Number of Containers	Number of Drums (55 gal)	Management Method
A. Flammable					
1. Used Oil					
2. Paints a. Latex					
b. Oil Base					
3. Solvents, thinners, and stains					
4. Gasoline and oil (mixed)					
5. Aerosols (excluding pesticides/ herbicides)					
6. Other					
FLAMMABLE SUBTOTAL					

Management Methods

Re Re-used	Tr	Transfer Station	T-3	Stabilization
Rc Recycled	T-1	Incineration	D	Land Disposal
Bf Blended Fuel	T-2	Aqueous Treatment	Other	

Waste Category	Gallons	Pounds	Number of Containers	Number of Drums (55 gal)	Management Method
B. Pesticides					
Such as herbicides, insecticides, fungicides, etc.	____	____	____	____	____
PESTICIDE SUBTOTAL	____	____	____	____	____
C. Corrosives					
1. Acids a. Oxidizing	____	____	____	____	____
b. Non-Oxidizing	____	____	____	____	____
2. Alkaline	____	____	____	____	____
CORROSIVES SUBTOTAL	____	____	____	____	____
D. Oxidizers					
Excluding acids	____	____	____	____	____
OXIDIZERS SUBTOTAL	____	____	____	____	____
E. Miscellaneous					
1. Car Batteries	____	____	____	____	____
2. Dry Cells	____	____	____	____	____
3. Mercury	____	____	____	____	____
4. Other	____	____	____	____	____
MISC. SUBTOTAL	____	____	____	____	____
TOTAL WASTE COLLECTED	____	____	____	____	____

Rubia E. Packard
Chief, Permit Program Development
California Toxic Substances Control Program

Permit by Rule
Household Hazardous Waste Collection Facilities

During fiscal years 1989 and 1990, California has been focusing substantial efforts on the numerous facilities which handle non-RCRA or state-only regulated hazardous wastes. These facilities need to be brought into compliance with applicable state laws and regulations as quickly as possible. In order to do this, the Toxic Substances Control Program (TSCP) proposed the Permit Streamlining Program (PSP) and is currently developing a number of standardized permit strategies within this program.

PSP was designed to: 1) identify facility operations which do not require hazardous waste regulation or are adequately regulated by other regulatory programs; 2) significantly reduce the state hazardous waste program permitting/variance backlog; 3) expedite the permit decisions which need to be made; and 4) optimize the use of existing state resources. TSCP has also instituted PSP to ensure an equitable, consistent approach which: 1) identifies and categorizes hazardous waste streams and hazardous waste management practices and processes within the state-only regulated universe; 2) evaluates the nature of the hazardous waste stream under review and potential adverse impacts to health and the environment posed by mishandling of the waste in each category; 3) determines whether and what type of regulatory approach is appropriate for managing the particular waste stream and process; and 4) develops and implements the regulatory hazardous waste program approach.

The overall program direction is to pursue regulatory options in the following order: 1) removal from the TSCP regulatory universe if it is determined that the class of facilities is adequately regulated by another agency; 2) include in Permit by Rule (PBR) regulations unless specified criteria dictate that PBR is not applicable; 3) utilize a standardized permit; and 4) follow the full permit procedure. This approach is applicable not only to a variety of state-only facility categories already identified, but also to other portions of the state-only universe not yet identified.

The criteria that determine the inclusion of state-only facilities in the PBR process are based primarily upon the waste stream, treatment processes and degree of toxicity involved. Some facility operations or waste streams will not be addressed via the PBR approach. These facilities may fall out of the regulated universe or will be prioritized, based on

their potential public health/environmental risk, for inclusion in workplans for the Permitting and Surveillance and Enforcement Programs.

In addressing the need to more effectively regulate treatment and storage of state-only regulated hazardous wastes, TSCP is currently developing a number of regulatory packages utilizing PBR and standardized permit strategies. One of these regulatory packages covers Temporary Household Hazardous Waste Collection Facilities (THHWCFs).

The TSCP's Region 1 staff in Sacramento developed a draft regulatory package for the THHWCFs in 1989 and early 1990. This draft was prepared with extensive input and comment by a variety of affected parties. The draft regulations were forwarded to the Permit Program Development Unit in TSCP's headquarters office for preparation as a final regulatory package for submittal to the Office of Administrative Law (OAL). The Headquarters group also submitted the draft regulations to the Program's PSP Advisory Task Force for review and comment. The Task Force is composed of representatives from industry, public interest groups, the Legislature, public agencies and environmental groups.

The THHWCF regulations have been revised and reorganized to conform with the existing format for Title 22, California Code of Regulations (CCR). Originally, over thirty separate requirements were listed in the draft THHWCF regulations. The revised package contains ten categories of requirements comprising the original thirty-plus operating conditions.

Following are the key requirements of the proposed PBR regulations:

- Section 66203.3 provides a definition of a THHWCF, which is a household hazardous waste collection facility operated by or under contract to a public agency, provided the facility is operated in compliance with specified regulations.

- Section 66392 deems a facility to have a permit upon submittal of a PBR notification to TSCP. The notification must contain a variety of information such as a description of the location of the event, contact names, a certification that local authorities have been notified of the event, copies of local permits and the text of the public notice.

- Section 66392.2 contains operating requirements and restrictions including:

  - the facility shall accept only household hazardous waste, except as provided by Health and Safety Code Section 25158.1(d) which allows the acceptance of waste from small quantity commercial sources;

- acceptance of extremely hazardous waste is allowed if managed in accordance with Article 7, Chapter 30, Title 22, CCR;

- requires preparation/maintenance of an operation plan describing operation of the collection event in detail (days/hours of operation, location, training plan, contingency plan, waste analysis plan);

- siting criteria;

- waste handling criteria;

- requirements for removal of the waste after the event;

- reporting requirements; and

- public noticing requirements.

The proposed regulations will be discussed by the TSCP's Executive Staff for final approval on November 15, 1990. The package will then be submitted to the OAL in mid-December for publishing of the public notice. The 45-day public review and comment period would end in January 1991, with an effective date of the regulations in May 1991, if there are no problems with OAL and no additional public notice periods are required.

The Department is also preparing proposed regulations to regulate Permanent Household Hazardous Waste Collection Facilities (PHHWCFs). These regulations will be based on the existing THHWCF package, with differences in the length of storage time allowed and additional siting and operating controls. The initial draft PHHWCF package is scheduled to be completed in early 1991.

Comments of Dorothy Fettig
(Staff to Assemblywoman Sally Tanner, Chairwoman, Assembly Committee on Environmental Safety and Toxic Materials)

November 7, 1990

I have been asked to give an overview of current legislative activity on household hazardous waste and related topics. First I will give a brief history of the approach that the California Legislature has taken to this subject, and then I will give brief descriptions of bills acted on in 1990. Lastly, I will talk about some future trends we might see in this area.

Generally, California legislation on household hazardous waste over the last several years has come in reaction to the tremendous initiative shown by local governments, community groups, public interest groups, and environmental organizations in offering household hazardous waste management services to their constituencies.

As many of you know from first-hand experience, in trying to provide these services, local governments and other groups have encountered numerous stumbling blocks, such as fees, permit requirements, and transportation limitations.

As a result of these numerous logistical and economic problems, relatively minor modifications to the hazardous waste laws have been made over the years with the basic intent of accommodating the smoother operation of household toxics programs.

For example, perhaps the first California law which specifically addressed the needs of household hazardous waste programs was Assemblywoman Killea's (now Senator Killea) 1983 bill which amended state requirements governing the transport of hazardous waste, to allow people to legally transport up to five gallons or 50 pounds of hazardous waste without a manifest or the use of a registered hauler.

For several years legislation in this area addressed minor modifications to the overall regulatory scheme for the safe management of hazardous waste, in order to allow these household programs to operate. I am not aware of any legislative attempt over the years to exempt hazardous waste either from households or

from very small commercial generators from regulation, although placing the AB 1809 public information program and the AB 2448 grant program in the Integrated Waste Management Board, rather than the State Department of Health Services, was certainly an acknowledgment that household hazardous waste must be managed differently than hazardous waste from industry.

As many of you know from working on your county hazardous waste management plans, early household hazardous waste legislation in a sense grew out of the Legislature's efforts on the siting issue. Assemblywoman Tanner and others believed that the general public needed to better understand their role in hazardous waste generation -- both as consumers of products whose production generates hazardous waste, and as generators themselves when they go to dispose of these products.

She had hoped that better understanding the complexities of safely managing household toxics would foster an understanding of the hazardous waste management needs of larger generators, including the need for hazardous waste management facilities of various types and sizes.

Whether the growing momentum of the household toxics issue has in fact assisted with siting difficulties is not yet clear to us.

In any case, AB 1809 did require the California Integrated Waste Management Board to develop various programs to provide public information on household hazardous waste, and to provide technical assistance to local governments.

In the last few years there has been a growing acceptance, and recognition, of the importance of household programs, and of the need for all communities to have some level of collection service available to them.

In addition to the overall hazardous waste planning requirements of Assemblywoman Tanner's AB 2948 of 1986, two 1989 bills required that cities and counties plan for and provide household hazardous waste services. Those bills were AB 939 (Sher) and AB 888 (La Follette). Because of conflicts between the requirements of the two bills, AB 2707 (La Follette) was

introduced to conform the two bills to one another.

Which brings us up to this year's crop of bills. I'll just give you a brief description of a number of bills which were acted on by the Legislature this year.

AB 2597 by Assemblywoman Tanner (Chapter 1265, Statutes of 1990) was signed into law this year. The bill extends current law exemptions from the hazardous waste disposal fee, generator fee and facility fee to entities which operate household hazardous waste programs under an agreement with a public agency. The bill also removes the term "voluntary" from the definition of "voluntary hazardous waste collection program", because with the advent of AB 939 and AB 888 of last year these programs are no longer voluntary.

AB 2597 also exempts household collection sites which only accept specified materials for subsequent transport to a recycling facility from DHS permitting requirements. The materials that could be collected at such "recycle only" facilities are latex paint, used oil, antifreeze, lead-acid batteries, and household batteries.

AB 2641 by Assemblymembers Wright and Tanner (Chapter 1266, Statutes of 1990) authorizes local agencies which operate collection programs for household hazardous waste to allow small quantity commercial sources to participate in these programs if those generators meet the following criteria: 1) they generate less than 100 kilograms of hazardous waste per month; 2) they comply with the transportation limits in existing law; and 3) they do not bring more than 100 kilograms of hazardous waste to a collection program in any one month. Local agencies would be authorized to charge businesses a fee to cover their cost of providing this service.

AB 2641 also exempts hazardous waste which is separated from solid waste as part of a load-checking program from the hazardous waste disposal fee, generator fee, and from the Superfund tax and record-keeping requirements. The bill also exempts that portion of a solid waste facility that is used for the load-checking program, from the hazardous waste facility fee.

AB 2834 by Assemblyman Quackenbush (Chapter 1686, Statutes of 1990) makes changes to state law to conform our hazardous waste laws with the federal Resource Conservation and Recovery Act (RCRA). It adds several recyclable materials to the list of materials exempted from regulation under the hazardous waste laws. Among other things, this bill excludes from hazardous waste regulation any material used as an ingredient in an industrial process or to make a product, even if the material must first be treated by one or more of a variety of physical methods, such as filtering or screening.

I know that many of you have followed this exemption language because of its application to paint manufacturers being able to recycle waste paint without having to comply with hazardous waste permit and other requirements.

AB 2707 by Assemblywoman La Follette (Chapter 1406, Statutes of 1990) repeals provisions of existing law (enacted by AB 888 last year) which superseded requirements of AB 939 regarding household hazardous waste. It requires that cities and counties prepare a Household Hazardous Waste Element (which is separate from the source reduction and recycling element) of the county or city integrated waste management plan, which identifies a program for the safe management of household hazardous waste, and requires the Integrated Waste Management Board to approve or disapprove the HHWE's within 120 days of submittal. The bill authorizes the Board to approve an exemption or lessening of the requirements for a HHWE for a city or county that demonstrates that it cannot comply because of small size or population.

SB 1961 by Senator Killea died in the Senate Appropriations Committee. This bill would have required manufacturers of consumer containers of anti-freeze (ethylene glycol) to either label the container with a statement that it is a hazardous waste and must be disposed of or recycled properly, or to provide written materials or signs to inform consumers of the need to dispose/recycle properly.

AB 2965 by Assemblywoman Eastin (Chapter 1219, Statutes of 1990) increases the testing and recordkeeping requirements on

firms that produce and recycle used oil. Among other things, the bill exempts oil collected from households by curbside collection or other means, from hazardous waste permitting and fee requirements. It also exempts used oil generated during maintenance operations from reporting and manifesting requirements, while the used oil is being transported from its point of generation to a maintenance person's place of business for consolidation in a tank or other container.

SB 1200 by Senator Petris (Chapter 1657, Statutes of 1990) requires the Integrated Waste Management Board to adopt regulations by July 1, 1991, for a demonstration used oil collection program and transfers $1 million in Petroleum Violation Escrow Account funds for the program. It authorizes the Board to make grants of up to $75,000 for up to 50% of the cost of a used oil collection project.

This bill defines "used oil collection project" as a project undertaken by a local agency to encourage the collection, recycling, and proper disposal of used oil, which may include curbside collection and a public education component. The purpose of the bill is to encourage local governments to establish collection programs to recover used motor oil from households.

AB 3749 by Assemblyman Sher was vetoed by the Governor. This bill would have enacted the California Oil Recycling Enhancement Act to establish a system under which consumers may redeem used oil at certified used oil collection centers and receive a minimum of 5 cents per quart for the waste oil. The bill would have provided grants or loans to establish used oil collection programs.

AB 563 by Assemblyman Hannigan (Chapter 1173, Statutes of 1990) authorizes counties to establish a collection program for banned, unregistered, or outdated pesticides from farmers. It requires participating counties to submit applications to the State Department of Health Services for both hazardous waste identification numbers and an extremely hazardous waste disposal permit, and requests for variances from hauler, vehicle registration and manifest requirements; for the collected wastes

which are non-RCRA wastes.

Waste transported to such drop-off sites would be limited to five gallons or 50 pounds, and any participant who generates more than 100 kilograms of any RCRA waste or over 1 kilogram of any extremely hazardous waste would be required to obtain an EPA Identification number and to use a hazardous waste manifest.

The purpose of AB 563 is to provide a means for farmers who are storing "banned, unregistered, or outdated pesticides" to dispose of them appropriately by providing short-term amnesty from state fee and permit requirements.

AB 3530 by Assemblyman Margolin (Chapter 1631, Statutes of 1990) requires the Integrated Waste Management Board to conduct a study on the disposal and potential recyclability of household batteries. It also requires that the Board report to the Legislature by March 1, 1992 on the results of the study with recommendations for legislation, and it appropriates $150,000 from the Integrated Waste Management Fund to the Board for the study.

SB 1813 by Senator McCorquodale (Chapter 711, Statutes of 1990) allows the Integrated Waste Management Board to study the disposal and recyclability of used household batteries. The study may examine the effect of these batteries on solid waste landfills and transformation facilities and the potential for recycling.

Several bills were introduced this year on environmental labeling, including SB 1741 by Senator Torres. This bill, which died in the Senate, would have made it unlawful for manufacturers and distributors to claim in an advertisement or label that a consumer product is not harmful to, or is beneficial to, the environment by using such terms as "ecologically safe", or "green product", unless the product meets certain criteria.

AB 3030 by Assemblywoman Hansen died in the Assembly. This bill would have required the Integrated Waste Management Board to establish a labeling program to stimulate the manufacture of environmentally safe products and to adopt standards for products deemed to qualify for use of the logo. License fees would have been charged to fund the program.

AB 3994 by Assemblyman Sher was signed into law (Chapter

1413, Statutes of 1990). This bill prohibits a manufacturer or distributor from representing a consumer product as unharmful or beneficial to the environment unless that product meets specified criteria. The bill prohibits the use of terms like "ozone friendly", "biodegradable", "photodegradable", "recyclable", or "recycled", unless specified definitions are met.

On the regulatory front, the California Air Resources Board adopted regulations for reducing volatile organic compound emissions from consumer products. The regulations establish VOC content limits for sixteen consumer products (air fresheners, automotive windshield washer fluids, bathroom and tile cleaners, engine degreasers, floor polishes, furniture maintenance products, general purpose cleaners, glass cleaners, hairsprays, hair mousses, hair styling gels, aerosol insect repellants, laundry prewash, oven cleaners, nail polish removers, and shaving creams).

These regulations came about because of a law which required the Board to achieve the maximum feasible reduction in reactive organic compounds emitted from consumer products. Related efforts may follow.

On the indoor air quality front, AB 3152 by Assemblywoman Taint died in the Senate. This bill would have required the Air Resources Board to report to the Legislature on ways to mitigate indoor air pollution problems, including emissions from consumer products and building materials.

In conclusion, I will list a few household hazardous waste related topics that may be addressed by legislation in 1991 and future years. These include additional indoor air quality concerns, the hazardous waste management needs of very small businesses, ways to optimize source reduction and recycling, the high cost of programs and appropriate funding mechanisms (such as various fees), encouraging the use of less-hazardous substitute products, and the permitting and/or siting needs of household hazardous waste programs.

Thank you all for your kind attention, and thank you very much for the opportunity to be part of this conference.

DEVELOPING A STRATEGY FOR ESTABLISHING MOBILE COLLECTION CENTERS

Linda Giannelli Pratt
San Diego County Department of Health Services
Household Hazardous Materials Program

Background:

The proper disposal of household hazardous materials continues to be a pressing ecological issue in San Diego. It is estimated that more than 8300 tons of household hazardous waste are generated in San Diego County each year. The **San Diego Regional Household Hazardous Materials Program** (HHMP) has been providing community education as well as collection and disposal services throughout the County since 1985. The program is jointly funded by the County Department of Public Works and City of San Diego Waste Management Department.

Current Level of Collection/Disposal Service

- One-day collection events offered 13 times per year throughout the County (Eight within the City of San Diego and five in the county outside of the City of San Diego).
- Appropriate Technologies II (Chula Vista), a State permitted TSDF, available to receive household hazardous waste six days per week.
- City of Coronado Permanent Collection Center available on a routine basis six days a week to receive household hazardous materials.
- Home pick-up service available on a limited basis to handicapped residents.

The REGIONAL Approach:

The establishment of Regional Mobile Collection and Transfer Centers would certainly enhance the current level of service to the community. Implementing a **regional** plan provides an effective and equitable system to collect and remove household hazardous materials.

Table One provides a comparison between the one-day Collection Event, the **Permanent** Collection Center and the **Mobile** Collection Center. The information summarizes the anticipated level of service to the community, as well as the staff time and cost of implementing and operating each of the three collection options. An evaluation of the specific needs of the region indicates that the Mobile Collection Center offers the greatest degree of flexibility, while serving the largest number of residents at a reasonable cost. **Table Two** illustrates the estimated planning time required for a Collection Event, a Permanent Collection Center and a Mobile Collection Center.

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The Process:

There are a number of challenges facing the administering agency of a Household Materials Program in developing and implementing collection centers. Initially, it seemed that there were a few simple steps to follow:

- choosing a site,
- completing the State and local permits,
- determining capital expenditures, and
- developing an operations plan, which includes a description of the equipment, staffing requirements, and security at the site.

It soon became evident that completing these tasks in a timely manner was definitely not a simple process.

The original intent was to establish approximately four permanent collection centers throughout San Diego county by 1994. However, the political reality is that the "siting" of any hazardous waste facility is not an easy process, regardless of the fact that the "facility" is nothing more than a storage trailer designed to receive only household hazardous waste. As a result, the program objective was changed from establishing a permanent collection center to establishing a mobile collection center. The most obvious benefits for so doing include:

- no requirement for a State issued Treatment Storage and Disposal Facility Permit (TSDF);
- exemption from Procedures for Approval of New Facilities, which is required for TSDF's in the Health and Safety Code, Division 20, Chapter 6.5, Article 8.7; and
- greater acceptance by local planning departments, other local agencies, and concerned public because the mobile collection trailer is present for a limited time.

Once it was decided that the Mobile Collection Center was the approach to follow, the intent was to establish approximately four locations county-wide. The primary concern which then became apparent, especially from those jurisdictions where the sites were proposed, revolved around the issue of **"fair share"**. Each city and county is obligated under the Integrated Waste Management Plan (AB2707), to manage all of the solid waste generated within its community. Hence, each city has an implied responsibility to provide a location that would be appropriate for use as a Mobile Collection Center site. As a result, the concept of **Regional Mobile Collection Center** was developed.

Based upon current demographic information, San Diego County was divided into five regions, listed below, for the first phase of this project. The needs of the unincorporated areas will be addressed in the second phase of the project.

Region	Cities
North County West	Oceanside, Carlsbad, Encinitas, Del Mar, Solana Beach
North County East	Vista, San Marcos, Escondido, Poway
City of San Diego	All the area within the City of San Diego
East Suburban	Santee, La Mesa, El Cajon, Lemon Grove
South Suburban	Chula Vista, Coronado, Imperial Beach, National City

Region-specific meetings were held whereby representatives from the HHMP met with staff from each of the cities within the same region. This facilitated the ability to address the specific needs of each region, and work together to resolve common concerns. The **MOBILE COLLECTION CENTER FACT SHEET** was designed to summarize pertinent information commonly requested by local governments as well as community groups. The benefits of the Regional approach include:

- more efficient use of staff time to work with a small group of cities as compared to working with each city on an individual basis;
- development of a consistent level of service in each city within the region;
- enhanced coordination between cities so that each will move forward at the same pace to complete the groundwork required to establish and operate each site, such as Service Agreements and contracts;
- extensive information available to City staff who can then provide a thorough briefing of the issue to their City Council, City Manager's Office, and other pertinent city agencies; and
- opportunities for joint-sponsorship of publicity and community outreach campaigns throughout the region.

Conclusion:

Designing a comprehensive process to review the collection and disposal options currently available, and to project what the needs will be, is a critical planning element that must be addressed. First of all, it must be determined which local entities need to be included in the review process. Staff from the following agencies should be contacted in order to clarify the level of involvement needed or desired:

- City Managers Office
- Fire Department
- Planning Department
- Zoning/Land Use Department
- Public Works/City Maintenance Department

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Once the "team" of players have been established, it is then a matter of evaluating funding opportunities and operational factors which certainly have a bearing on the level of service that can be provided. It is strongly advised to be conservative in scheduling the hours of operation for each center. The public is much more willing to receive an increased level of service than a reduction in what was already provided. Additionally, a thorough evaluation of the operational and administrative factors should be conducted within three to five months of operation. Reconvening the planning team is recommended to assure that the objectives have been met.

The Mobile Collection Center, as described, can be designed to meet the special needs of each community. Although it may be the best choice for San Diego County at this time, other options will continue to be explored. As solid waste transfer stations are established, the opportunity to incorporate permanent household hazardous materials collection centers may become a viable option. Perhaps the continuation of the one-day Collection Events may be the best alternative for the unincorporated areas that have very sparse population densities. In any case, having a comprehensive planning process in place will enhance the ability of the San Diego Regional Household Hazardous Materials Program to continue to develop into the best that it can be for the community that it serves.

TABLE 1:

HOUSEHOLD HAZARDOUS MATERIALS PROGRAM
REGIONAL COLLECTION OPTIONS (Outside of the City of San Diego)

COLLECTION OPTIONS	ONE-DAY COLLECTION EVENT		PERMANENT COLLECTION CENTER		MOBILE COLLECTION CENTER	
Number of Sites Per Region	1		1		3	
Estimated Residents served	350		800		1,000	
Annual Days of Operation	1		258		36 days per site 108 days per region	
PRELIMINARY FACTORS	**COST**	**TIME**	**COST**	**TIME**	**COST**	**TIME**
Site Selection (includes community presentations)	$ 250	5 hours	$ 5,000	100 hours	$ 6,000	120 hours
State Permitting Process	$ 200	4 hours	$ 2,000	40 hours	$ 600	12 hours
Local Permit Processing Options:						
• Conditional Use Permit	N/A	N/A	$ 800	16 hours	unknown	unknown
• Environmental Impact Report	N/A	N/A	$25,000	Consultant	unknown	unknown
Specifically-equipped Storage Container	N/A	N/A	$28,000	Vendor	$28,000	Vendor
Minimal Capital Improvement	N/A	N/A	$ 3,000	40 hours	$ 9,000	120 hours
SUBTOTAL	$ 450	9 hours	$63,800	196 hours	$43,600	252 hours
ON-GOING OPERATION						
Education/Publicity	$ 2,500	per event	$ 2,500	per year	$ 3,500	per year
Labor and Supplies	$28,000	500 hours	$51,600	1032 hours	$64,800	1296
Disposal of Wastes	$15,000	per event	$34,500	per year	$43,100	per year
SUBTOTAL	$45,500	480 hours	$88,600	1032 hours	$111,400	[illegible]
Cost per Resident Served	$ 130		$ 111		$ 111	
(Preliminary Factors & On-going Operation) TOTAL	$45,950	489 hours	$152,400	1228 hours	$155,000	[illegible]

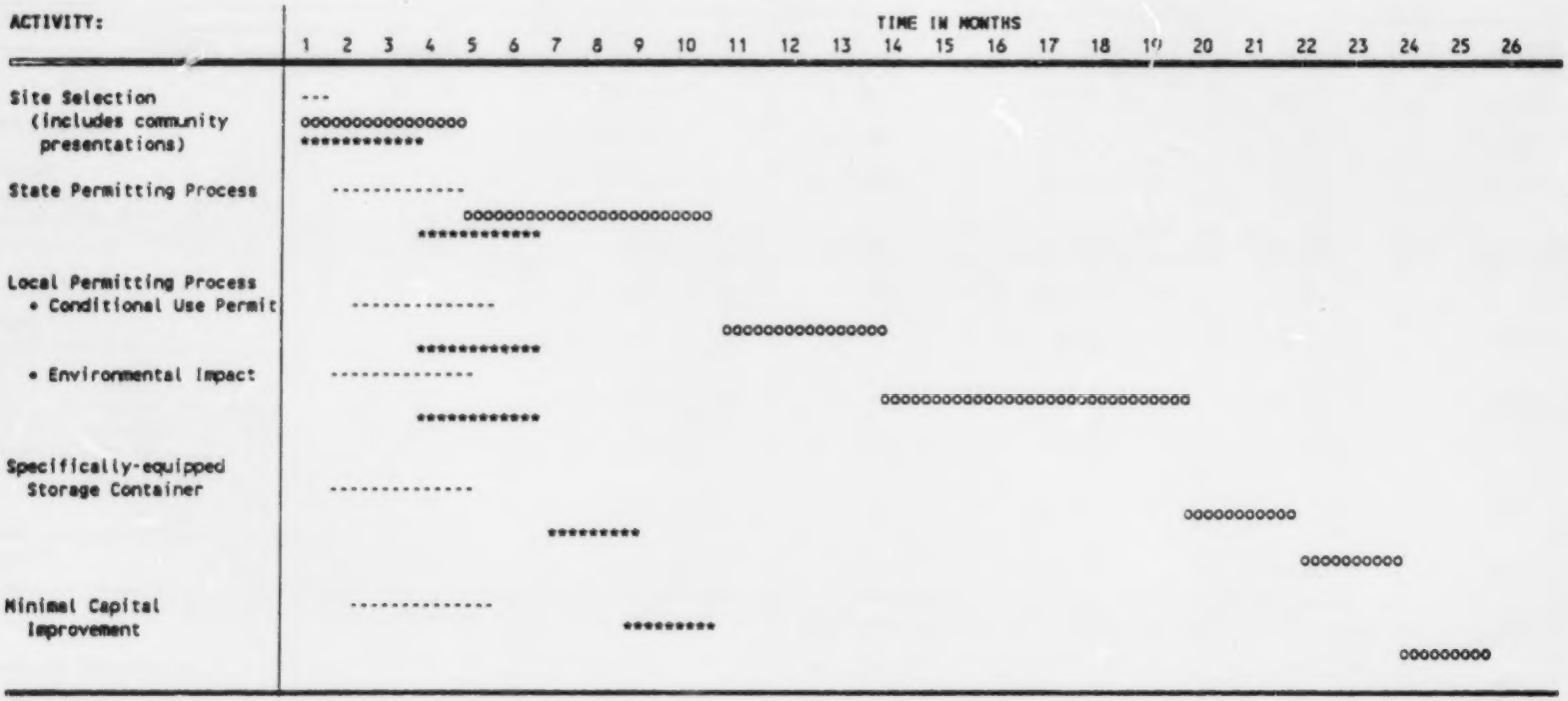
UP/HHMPT.LP

TABLE 2:

HOUSEHOLD HAZARDOUS MATERIALS PROGRAM
COMPARISON OF REGIONAL COLLECTION OPTIONS

ESTIMATED TIMELINE FOR COMPLETION OF PRELIMINARY ACTIVITIES

KEY: ONE-DAY COLLECTION EVENT = ------
PERMANENT COLLECTION CENTER = oooooo
MOBILE COLLECTION CENTER = ******


ACTIVITY:
TIME IN MONTHS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Site Selection (includes community presentations)
State Permitting Process
Local Permitting Process
• Conditional Use Permit
• Environmental Impact
Specifically-equipped Storage Container
Minimal Capital Improvement

SUMMARY: Table 2 provides a comparison between the time required to complete the preliminary activities for implementing the Collection options listed below:

Collection Options	One-Day Collection Event	Permanent Collection Center	Mobile Collection Center
Number of Sites Per Region	1	1	3
Annual Days of Operation	1	258	36 days per site 108 days per region
Estimated Time Required to Complete Preliminary Activities	6 months	2 years	1 year

WP/TIME.LP

SAN DIEGO REGIONAL
HOUSEHOLD HAZARDOUS MATERIALS PROGRAM

MOBILE COLLECTION CENTER
FACT SHEET

Since 1985, the City and the County have jointly sponsored the Household Hazardous Materials Program, which is administered by the County Department of Health Services. The Program serves to combine community education about household hazardous materials with proper recycling and disposal options.

The establishment of the Mobile Collection Centers will meet two key objectives of the Household Hazardous Materials Program:

1. Increase the level of service to the community by providing convenient and consistent "drop-off" points for household hazardous materials.

2. Provide additional opportunities to distribute information on methods to reduce the volume of hazardous materials used in the home.

Community Support:

An average of 700 public inquiry calls per month are received by the Household Hazardous Materials Program. A recent survey of the callers revealed that there is overwhelming support for collection centers within the community.

The **REGIONAL** Approach:

Implementing a regional plan for Mobile Collection Centers provides an effective and equitable system to collect and remove household hazardous waste. The County has been divided into five regions (excluding the City of San Diego), each of which include about four cities. The objective of the regional approach is to have each city within the same region move forward at the same pace to establish a location for the mobile collection center.

Projected Utilization of the Mobile Collection Centers:

- The Mobile Collection Center consists of a specifically equipped mobile storage trailer, and will require a total space of approximately 1000 square feet.
- Each Center will be open no more than 3 days per month.
- Staff will be onsite to receive, categorize and lab-pack the material, as well as distribute educational packets.
- Each Center is projected to serve 700 residents per year.
- Based upon current information, the average volume brought to the Center is 8 gallons per resident.
- The cost to operate the Center will be paid by the San Diego County Household Hazardous Materials Program.

For more information, contact Linda Pratt, County of San Diego Department of Health Services, Hazardous Materials Management Division at 338-2215 or the Household Hazardous Materials Hotline at 338-2267.

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF HEALTH SERVICES
714/744 P STREET
P.O. BOX 942732
SACRAMENTO, CA 94234-7320

November 7, 1990

Dear Conference Participant:

Thank you for your interest in Proposition 105. As you may be aware, the Toxic Substances Control Program of the Department of Health Services conducted industry and public workshops in May and in September to facilitate the ability of interested parties to voice their concerns. The comments have been extremely valuable during the redrafts of the regulations. The latest draft of the regulations should be completed in November. If you did not have the opportunity to voice your concerns during either of these two workshops, you will have another opportunity. When this draft of the regulations is completed, it will be submitted to the Office of Administrative Law, and thus begin the formal regulation process. The regulations will be public noticed followed by a forty-five day comment period. A hearing will be held, giving commentors an additional opportunity to voice concerns.

I have attached some background information on Proposition 105. This information includes; ~~a copy of the second draft of regulations and information letter,~~ a copy of the initiative, ~~a copy of a liability letter sent by C. David Willis and~~ a summary of findings from the proposition 105 working group. I hope you find this information as well as my presentation helpful in understanding the complexities of Proposition 105.

Please feel free to ask any question during or after my presentation. If you are interested in being added to the proposition 105 mailing list, you can sign up your name on the list after the presentation.

Thank you once again for interest. If you find that you have any additional questions or concerns and are unable to find me at the conference, please do not hesitate to call me at (916) 327-1194.

Sincerely,

Yvonne Najah Addassi
Proposition 105 Coordinator

Attachments

Text of Proposed Law

This initiative measure is submitted to the people in accordance with the provisions of Article II, Section 8 of the Constitution.

This initiative measure adds sections to the Government Code and the Insurance Code; therefore, new provisions proposed to be added are printed in *italic type* to indicate that they are new.

PROPOSED LAW

PUBLIC'S RIGHT TO KNOW ACT

SECTION 1. The people of California find that the lack of truth in advertising strongly reduces the public's right to accurate information, resulting in harm to their health and finances. The public's right to know this information will help consumers to make good decisions on the vital matters addressed in this initiative:

- *Household toxic products*
- *Fraudulent health insurance sales to senior citizens*
- *Nursing home abuses, which deprive seniors of the right to safety and dignity that they have earned*
- *The true sources of campaign funds for initiatives*
- *Disclosure of business dealings with apartheid South Africa*

The people therefore declare their rights as consumers to make informed, intelligent decisions in these important areas, free from fraud or deceit.

The people hereby enact the provisions of this initiative in furtherance of these rights.

SECTION 2. Article 10 (commencing with Section 66799) is added to Chapter 3 of Title 7.3 of the Government Code, to read:

Article 10. Household Toxic Products Disclosure

66798. (a) Any business which advertises a household toxic product intended for use by the general public shall provide clear and reasonable warning that the product should not be placed in the trash unless completely empty, or poured down the drain.

(b) "Advertises" means mass-media advertisements such as electronic media, print, outdoor, and direct mail, but not including posters or displays in a retail store.

(c) "Clear and reasonable warning" may be provided by general methods such as labels on household toxic products, posting of notices, placing notices in public news media, and similar methods. The warning may refer to the specific product, or to household toxic products in general. The warning shall notify consumers that they may call the Department of Health Service's toll-free number for information about proper disposal of household toxic products, and shall state the number.

66798.1. This section shall not apply to household use pesticides subject to storage and labelling requirements pursuant to the Food and Agricultural Code or the Federal Insecticide, Fungicide, and Rodenticide Act.

66798.2. Small or incidental advertisers of household toxic products are exempt from this Article provided that any advertiser with an annual California advertising budget for household toxic products of fifty thousand dollars ($50,000.00) or more shall not be exempted.

66798.3. The Department of Health Services shall issue regulations to implement this Article, including but not limited to defining "household toxic products" (Section 66798), defining the nature and quantity of warnings required (Section 66798(c)) and defining small advertisers (Section 66798.2).

66798.4. The remedies for violations of this Article are as provided in Government Code Section 12999.

SECTION 7. Section 12999 is added to the Government Code, to read:

12999. The sole remedies for violations of the following provisions of this Act shall be fines of ten thousand dollars ($10,000.00) for each advertisement, contract or prospectus which violates this Act. The provisions are: Article 10 (commencing with Section 66798) of Chapter 3 of Title 7.3 of the Government Code; Sections 10165.1–10165.5 of the Insurance Code; Chapter 2.85 (commencing with Section 1569.85) of Division 2 of the Health and Safety Code; and Article 6 (commencing with Section 12981) of Chapter 3 of Part 2 of Division 3 of Title 2 of the Government Code. For purposes of this Act, multiple copies of the same advertisement, contract or prospectus shall count as one violation. Any person may bring an action in Superior Court to impose any fines pursuant to this Act. Fines shall be deposited to the General Fund of the State.

SECTION 8. *If any provision of this Act or the application thereof is held invalid, that invalidity shall not affect other provisions or applications of the Act which can be given effect without the invalid provision or application, and to this end the provisions of this Act are severable.*

SECTION 9. *Nothing in this Act shall alter or diminish any legal obligation otherwise required in common law or by statute or regulation. Fines imposed under this Act shall be in addition to any penalties or sanctions otherwise prescribed by law. The disclosures required by this Act shall be without prejudice to the enactment of statutes or adoption of regulations to provide for additional disclosures.*

SECTION 10. *To further its purposes, this initiative may be amended by statute, passed in each house by a two-thirds vote.*

SECTION 11. *This Act shall take effect upon adoption by the people, but the substantive provisions shall not become operative until January 1 of the second year following passage of this Act. The administrative agencies shall adopt the regulations specified by this Act as soon as is reasonably possible, but in no event later than the operative date of this Act.*

This is only provisions dealing w/toxics.

I. INTRODUCTION

Proposition 105 passed by California voters in November 1989 and substantive provision taking effect January 1990, requires advertisers' warnings regarding the proper disposal of household toxic products; that the Department issue specified regulations for guidelines and implementation, and provide a toll-free information number for consumer inquiries regarding proper disposal.

The workload mandated by Proposition 105 requires:

1. The development of definitions on the following:

   a. Define "household toxic products."
   b. Define the nature, quantity and method of warnings required.
   c. Define "small and incidental advertisers."

2. Development of regulations to implement substantive provisions.

3. Establishment of a toll-free number to answer consumer inquiries.

WORKING-GROUP MODEL

A working-group model was used to develop preliminary recommendations to the Department. Individuals, divisions, departments, boards, and agencies were identified and contacted to participate in the group. The focus of the group was to develop integrated policy recommendations to the Department in the following areas: a) definitions and clarification of terms for regulation development, b) the scope and purpose of initiative, and c) proposals and strategies for implementation. Unless otherwise noted, all group decision were made by consensus.

The group was comprised of the following people:

Derrick Adachi, Dept. of Food & Agriculture
Yvonne Najah Addassi, Dept. of Health Srvs., TSCP, OPGL
Herb Berton, Waste Management Board
Nancy Carroll, Dept. of Health Srvs., TSCP, ATD
Judy Frantz, Dept. of Health Srvs., TSCP, Region 1
Steve Koyosako, Dept. of Health Srvs., TSCP, Legal
Stan Lau, Dept. of Health Srvs., TSCP, ATS
Guenther Moskat, Dept. of Health Srvs., TSCP, ATD
Gina Purin, Norcal Solid Waste Systems
Jim Rogers, C.U.R.E. (Proposition Proponents)
Dan Walsh, Dept. of Health Srvs., Food & Drug Branch

EXECUTIVE SUMMARY
RECOMMENDATIONS FOR THE IMPLEMENTATION
FOR PROPOSITION 105

For the purposes of implementation of Proposition 105, the Toxic Substances Control Program will use the following as broad-based guidelines for the development of regulations.

PURPOSE & INTENT OF LEGISLATION:

To provide consumer information on proper disposal of Household Toxic Products.

DEFINITION OF HOUSEHOLD TOXIC PRODUCT

A household toxic product is any household product that at time of disposal is considered a hazardous waste as defined in Chapter 15 (H&SC) and as determined by criteria set forth in Article 11, Title 22, CCR.

DEFINITION OF SALES ADVERTISING

Advertising means any representation, including, but not limited to statements about products, in mass media, disseminated in any manner or by any means, for purpose of inducing, or likely to induce, directly or indirectly the sale of use of any household toxic product.

DEFINITION OF INFORMATIONAL ADVERTISING

Advertising produced by businesses and distributed to the public by mass media to provide proper disposal information on "household toxic products," for the purpose of public education and compliance with proposition 105.

NATURE AND FREQUENCY OF WARNINGS

All warnings must be "clear and reasonable." The Department will develop "clear and reasonable" criteria for each methods of warning identified. Warnings can take the form of labeling or package inserts or by means of mass media. Mass media advertising can be done either as warnings attached to current sales advertising or the development of alternative informational advertising. All warnings must contain information on household toxic products, proper disposal information and the Departments toll-free number. For informational advertising, the nature of warnings should be "the same or similar" to current sales advertising, and the frequency should be linked by a ratio to current sales advertising.

SMALL AND INCIDENTAL ADVERTISERS

Small and Incidental advertisers includes any business whose annual California advertising budget for household toxic products does not exceed $50,000.

The following people or organizations were asked to participate in the group, but either didn't respond or attend the meetings.

Arnie Pieters, Assembly Toxics
Consumers Union

II. SUMMARY OF RECOMMENDATIONS

A. INTRODUCTION

The working group sought to build upon information developed from previous initiative efforts such as Proposition 65, and to utilize all information available on current laws and definitions, examples and analysis of other states' programs, and the effectiveness of different types of warnings.

B. PURPOSE AND INTENT OF LEGISLATION

"To provide consumer information on proper disposal of Household Toxic products."

C. DEFINITION OF HOUSEHOLD TOXIC PRODUCT

For purposes of Proposition 105, a "household toxic product" means any product customarily produced or distributed for the sale, consumption or use, or customarily stored by individuals in or about the household and as a waste is considered a "hazardous waste" as defined in section 25117, Chapter 6.5 of the Health and Safety Code, and as determined by criteria set forth in the Article 11, Title 22, Division 4 of the California Code of CCR.

The following item needs to be added:
- to explicitly state that automotive products are included

D. DEFINITION OF ADVERTISING

For the purposes of proposition 105, there are two different types of advertising. The first type is what businesses do to sell products, (sales advertising) and the second, is what businesses will have to do to comply the with advertising provision of proposition 105 (informational advertising).

1. DEFINITION OF SALES ADVERTISING

"Advertising means any representation, including, but not limited to statements about products, in mass media, disseminated in any manner or by any means, for purpose of inducing, or likely to induce, directly or indirectly the sale or use of any household toxic product."

- except exclusively advertisements as posters or displays in retail stores
- except for small or incidental advertisers.

2. DEFINITION OF INFORMATIONAL ADVERTISING

Informational Advertising is advertising produced by businesses and distributed to the public by mass media to provide information on "household toxic products," for the purpose of public education and compliance with proposition 105. The group felt it was necessary to further define and clarify what types of advertising that would be acceptable for "businesses" to comply with proposition 105. The group also agreed that for each type of advertising, a "safe harbor" should be developed for maximum effectiveness. This will be discussed in the Detailed Report of Findings.

E. NATURE AND FREQUENCY OF WARNINGS

The group agreed that two different approaches could be utilized for warnings placed in mass media. The first approach would be warnings placed at the end of every advertisement. The second approach would be the development of informational advertising about "generic household toxic products." For this type of advertising, the group agreed that a ratio (sales advertising:informational advertising) be developed to determine frequency, and that the nature of the warnings, should be "the same or similar" to sales advertising currently being done. For example, approximately the same time and day on the same television or radio station.

The group targeted advertising other than mass media to include labeling, package inserts, or a retail store integrated program. Labeling and package inserts would have to be done on all products and be clearly understandable and visible to the general public.

F. SMALL AND INCIDENTAL ADVERTISERS

The group agreed that these two terms were adequately defined in the proposition. This definition would include any business whose annual California advertising budget for household toxic products does not exceed $50,000.

CEPUP AND PUBLIC EDUCATION ABOUT HOUSEHOLD HAZARDOUS WASTE

Herbert D. Thier, Ed.D., Director
Chemical Education for Public Understanding Program
Lawrence Hall of Science
University of California, Berkeley

Understanding chemicals and how they interact with people and the environment is essential to informed citizenship in any society. It is not productive for a society to have its populace make decisions solely on an emotional basis. Rather than anxiously demanding answers, it is essential that:

1. People learn to ask pertinent questions, obtain evidence, and use it as the basis for decision-making.
2. People understanding the limitations associated with scientific evidence.
3. People understand the nature of scientific inquiry in order to participate in formulating effective chemical-related policies.

The Chemical Education for Public Understanding Program (CEPUP) is helping meet this educational need by designing activity-based instructional materials for both schools and the community. The activities highlight chemical concepts and processes associated with current societal issues. The goal of CEPUP is to develop greater public awareness, knowledge, and understanding about chemicals and how they interact with our lives. Accomplishing this goal requires the development of materials-centered experiences that motivate people to challenge their preconceived notions about chemicals and their uses in our society. We need to involve the general population in these kinds of materials-centered experiences about chemicals and their uses to contribute to eliminating public ignorance. The greater the contribution made to this goal the less the public will exhibit the persistent illogical fear of chemicals, which is chemophobia.

Chemicals In Society

The CEPUP contribution to community and workplace education about chemicals is called the CHEMICALS IN SOCIETY program. It currently consists of seven activities designed for and tested in the realities of community education. The program includes a clear, concise leader's guide to the activities and an inexpensive kit of materials for carrying out all of the activities. In addition there is a self-instructional participant's guide so that individuals can follow up on areas of interest to them even if, as is often true, there is not time for the whole program at the community meeting.

The table in Appendix A of this paper lists the activity titles and their purposes, and serves as a summary of the intent of the program. As an example of the self-instructional materials in CHEMICALS IN SOCIETY, the *Hazardous Wastes In the Home* activity is included as Appendix B.

CHEMICALS IN SOCIETY materials have been used by a wide variety of community and workplace groups. It has been introduced to the workplace through workshops sponsored by CEPUP, the Peninsula Industry Business Association (PIBA) in the Bay Area, and the Society of Industrial Hygienists of Orange and Los Angeles Counties. The Cooperative Extension division of the University of California trained 50 of its county leaders to use CHEMICALS IN SOCIETY in their work with the general public.

Future goals for the CHEMICALS IN SOCIETY program include adding new activities and further exploring the role and value of science teachers as community educators.

CEPUP In the Schools

A major portion of CEPUP's financial resources and professional effort is dedicated to improving the quality of science education of the most important renewable resource our society has — its young people. Begun in 1984 as a local San Francisco Bay Area project supported by California industry, *CEPUP in the Schools* has grown into a major national and international project, operating this year in over 30 states and in Australia and Spain. Currently funded by the

National Science Foundation and private foundations and industries nationwide, the goals of the *CEPUP IN THE SCHOOLS* project are:

- To provide school groups with educational experiences focusing on chemicals and their interaction with people and the environment;
- To promote the use of scientific principles, processes, and evidence in public decision making;
- To contribute to improving the quality of science education in America;
- To enhance the role of science teachers as educational leaders in their own communities.

These goals are being accomplished through the design, testing, and distribution of a series of experience-based sets of science activities called modules that focus on the science embedded in major societal issues of interest to students and their teachers. Designed to help teachers more effectively accomplish emerging local and national goals for science education in America, CEPUP focuses on basic concepts and processes of science related to chemicals and their uses in our society. The table in Appendix C lists the module titles and their purposes.

CEPUP does not teach people what decisions to make. Instead, it provides the necessary knowledge and understanding so that individuals can more effectively make their own decisions as participating members of a free and democratic society.

As a science program, CEPUP is non-advocacy and evidence-based at all times. Science provides people with the evidence they can use to make decisions. The people make the decisions. Therefore, it is essential that our educational program generally teach the skills and processes of decision-making so that the students in today's classes become informed voters and leaders in their communities. Many junior high school students studying CEPUP today will vote in the next presidential election. Our goal is that their voting for individuals and on issues will be based on evidence instead of emotionalism and will reflect their mastery of basic science concepts and processes and effective decision-making skills.

As part of its efforts, CEPUP is designing instruments and collecting evidence to document these changes in knowledge and attitudes on the part of both students and their teachers. Early evidence from the field indicates significant accomplishments in the broad-based goals that characterize the *CEPUP in the Schools* Project.

The CHEM Project

CHEMICALS, HEALTH, ENVIRONMENT, AND ME (CHEM) is a series of ten units designed to provide experiences for fifth and sixth graders that help them to accomplish an understanding of:

1) the nature of chemicals and how they interact with the environment;
2) how to collect, process and analyze information;
3) how to use scientific evidence as a basis for life-style oriented decisions;
4) how studying science and mathematics can be a productive and relevant part of their lives.

Each unit consists of one or more activities focusing on a single concept, which relate easily to local and state expectations for the science program. The units use commonly available household and classroom supplies to bring laboratory experiences to the fifth and sixth grade levels. The emphasis in all units is on direct experience by the learner. The intent is to use societal issue-oriented science materials to provide a positive, productive teaching experience so that teachers are encouraged to make experience-based science an integral part of their overall planning for instruction.

CHEM units have been designed to focus on science and include suggested related mathematics, social science, and language activities. The selection of the units is based on the growing interest of teachers in having their science programs reflect issues and matters of direct concern to themselves and to their students. National professional interest in CHEM is indicated by the cooperative effort between the National Science Teachers Association (NSTA) and CHEM to implement the program nationally.

This effort is made possible by a grant from the Exxon Education Foundation to CEPUP.

The emphasis on investigation and the use of evidence found in the materials was part of the process used to develop the CHEM program. The original idea and funding for the development of CHEM was provided by the Council of Industries and the Industrial Association, Inc. of Contra Costa County, California. Over twenty classroom teachers cooperated with the CEPUP team at the Lawrence Hall of Science throughout the development of the program. These same teachers' classrooms served as our laboratory for the trial of newly-developed materials. Based on the evidence obtained in these trials, the materials were revised to make them more effective for widespread use.

The CHEM program consists of a Teacher's Guide containing all print materials including blackline masters of all recommended student activity sheets. All CHEM teachers have permission to reproduce as many copies of the student sheets as needed for their classes Complete equipment and materials kits are available at low cost. As an example of the kinds of units included in CHEM, the following is a synopsis of the contents of the CHEM *Hazardous Home* Activity:

> Students use pictures of different rooms to identify potentially hazardous chemicals found in the home. They are encouraged to work with their families to set up a home hazardous substance inventory program. Students complete a survey and extend it to adults in their community to investigate the correct disposal procedures for various hazardous substances.

An example of the *Home Hazardous Substance Inventory Sheet* is included as Appendix D for your information and use.

CEPUP invites all of you to join us in the effort to eliminate public ignorance about chemicals and their use in our society. Contact us at:

CEPUP
Lawrence Hall of Science
University of California
Berkeley, CA 94720
Phone: (415) 642-8718
FAX: (415) 642-1055

APPENDIX A: CHEMICALS IN SOCIETY

ACTIVITY	PURPOSE
WHAT IS A CHEMICAL?	• To define what a chemical is. • To clarify the participants' knowledge of: risks and benefits of chemicals, natural and artificial chemicals, safe and dangerous chemicals, useful and non-useful chemicals, • To clarify the distinction between knowledge of chemicals and attitudes about chemicals
PARTS PER MILLION	• To provide visual experience that will help the participant become familiar with the meaning of concentration, ppm, and ppb.
HAZARDOUS WASTES IN THE HOME	• To define hazardous waste. • To determine the safe use and disposal of various household products. • To emphasize the potential hazards of improperly discarded substances. • To emphasize the need for coordinated disposal procedures in all communities.
TOXIC TROUBLE IN FRUITVALE	• To introduce participants to groundwater, its movements, and how it becomes contaminated. • To introduce how data can be used to construct a plume showing the spread of a contaminant in groundwater.
TOXICOLOGY	• To determine, through personal experience, an individual's taste threshold for salt. • To see how an average threshold value for the entire group can be obtained. • To relate the taste test exercise to real toxicity tests. • To outline the uncertainties and difficulties of real toxicity tests in determining toxic thresholds for humans.
MAKING DECISIONS	• To introduce risk by getting participants personally involved in a risk-oriented decision. • To emphasize that personal risk decisions are usually based on a combination of evidence and life-style variables.
RISKO - THE GAME OF LIFE	• To help participants realize that all of life involves risk. • To introduce the concept of risk comparison. • To learn how individuals and the group rate certain risks. • To understand which risks we choose and which risks we have no choice about. • To learn the actual rated values of some common risks. •To consider personal approaches to risk management.

APPENDIX B

HAZARDOUS WASTES IN THE HOME

Introduction

Many products used in the home, such as food, cleaners, polishing compounds, insecticides, etc., can be hazardous if used in the wrong way. For example, eating a half pound of table salt at once will probably kill some of the people who are so foolish. This, however, does not make table salt a legally hazardous substance because the probability of anyone eating a half pound at once is very remote. On the other hand, small amounts of salt in the diet of some people can be highly injurious to their health. As frequently stated, the dose makes the poison. When it comes to wastes the term "hazardous" does have a legal definition. A legally hazardous waste is a discarded substance whose chemical or biological nature makes it potentially dangerous to people. Although the sale of many products like paint thinners, insecticides, and smoke detectors may require no special warnings, the disposal of small leftover amounts or broken devices may be subject to regulation because, as waste, they are considered hazardous. This activity highlights issues related to the legal disposal of various household products. What is legal varies from state to state and changes with time. Recommendations given should be verified with local regulators.

What you can do

- **Review the list on page 9. Check which methods of disposal you think are legal for each one and circle the check for the method you consider most appropriate. Consider both the substance and its empty container.**

- **Compare each choice on your list to the recommended answers on page 10. Think about the differences. What can you do to better meet recommended procedures?**

It is important to realize that many substances commonly found in the home require special handling when it comes time to dispose of them. These are the items on page 8 for which there is only a check in the *Hazardous Waste Collection* column.

If your community does not already have one, you may want to explore the possibility of sponsoring a household hazards clean-up campaign.

A major public policy concern

➢ What are the wastes that can only be handled by a Hazardous Waste Collection Program?

Insecticides and petroleum-based solvents, such as paint thinner and many polishes, and their empty containers are examples.

➢ Many people think it is okay to dispose of left over solvents by washing them down the drain with lots of water or throwing them in the garbage.

Actually all materials containing petroleum-based solvents tend not to break down. They pose a continuing threat to ground water and surface water if discharged from sewage treatment systems into lakes, rivers, or other bodies of water.

➢ Consider that currently in certain states the only legal way to dispose of these wastes is by putting them into a hazardous waste landfill, incinerating them or taking them out of the state.

Some people are calling for all hazardous waste landfills to be banned. Such a ban would mean alternative approved disposal methods would need to be found.

➢ Many people want the carrying of hazardous wastes across state lines also banned. What if this happens in your state and no new disposal process for petroleum based solvents has been permitted?

What do you think will happen at such a time?
Consider how you think options such as the following will affect you, your lifestyle and your community:

Don't use it.
Use all of it up everytime. But what about the contaminated empty container?
Recycle it.
Dispose of it illegally.
Store it until a new disposal method is allowed.

➢ Clearly, a comprehensive policy regarding hazardous wastes and their disposal is a necessity in all communities.

Follow Up

* **Discuss these ideas with family and friends to encourage them to adapt safer procedures for handling household wastes.**
* **Work in your community for the establishment of comprehensive policies regarding the disposal of hazardous wastes in the community.**

Household Hazardous Waste Disposal

	Hazardous Waste Collection	Pour down drain	Recycle or use up	Put in trash
Aerosol cans (empty)				
Antifreeze (ethylene glycol)				
Broken smoke detectors (ionizing types)				
Cleaners with petroleum-based solvents				
Drain opener				
Expired prescriptions				
Furniture and floor polish				
Insecticides and pesticides				
Latex-based paint				
Liquor				
Mercury (from batteries and thermometers)				
Motor Oil				
Nail polish				
Nail polish remover				
Oven cleaner				
Paint thinner				
Rat, mouse, and gopher poison				
Rubbing alcohol				
Shoe polish				
Tub, tile, and shower stall cleaners				
Vanilla extract				

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Recommended Disposal Methods for Household Hazardous Waste

	Hazardous Waste Collection	Pour down drain	Recycle or use up	Put in trash	Comments
Aerosol cans (empty)				✔	
Antifreeze (ethylene glycol)		✔			Do not pour down drain into a septic tank
Broken smoke detectors (ionizing types)					Return to manufacturer or retailer (radioactive)
Cleaners containing petroleum-based solvents	✔				
Drain opener	✔	✔			Do not pour down drain into a septic tank
Expired prescriptions		✔		✔	Washed container only in trash
Furniture and floor polish	✔				
Insecticides and pesticides	✔				
Latex-based paint				✔	Solidify paint first by leaving lid off in a well-ventilated area
Liquor		✔			
Mercury (from batteries and thermometers)	✔		✔		
Motor Oil			✔		
Nail polish				✔	Solidify polish first by leaving lid off in a well-ventilated area
Nail polish remover		✔			
Oven cleaner	✔	✔			Do not pour down drain into a septic tank
Paint thinner			✔		
Rat, mouse, and gopher poison	✔				
Rubbing alcohol		✔		✔	Washed container only in trash
Shoe polish				✔	Dry out can first by leaving lid off in a well-ventilated area
Tub, tile, shower stall cleaners		✔			
Vanilla extract		✔			

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APPENDIX C: CEPUP IN THE SCHOOLS

MODULE	PURPOSE
Chemical Survey & Solutions and Pollution[1]	Students use survey methods to summarize class and adult knowledge of and attitudes towards chemicals. Students learn basic facts about chemicals and the public's perception of them. Water solutions are explored as students are introduced to parts per million, acids, bases, and neutralization. Through a simulated environmental issue, students examine dilution and neutralization as answers to pollution.
Risk Comparison[1]	Chance, probability, and personal decision making are introduced. Case histories of smallpox and cholera are studied to introduce epidemiology and record-keeping. Personal risk consciousness is introduced as students compare risks.
Determining Threshold Limits[1]	Students learn about threshold qualitative and quantitative analysis. The quantitative analysis of salt is used to simulate an animal toxicity test. Acute and chronic toxicity tests are simulated.
Investigating Groundwater: The Fruitvale Story[1]	Aquifiers, aquitards, sampling through well-drilling and the determination of plumes are all introduced as students investigate a simulated ground water contamination problem. Students role play various interests as they try to decide how to deal with the problem.
Toxic Waste[1]	Electroplating of copper is explored. The copper chloride plating solution is the "toxic waste." Students compare dilution, metal replacement, precipitation, and stabilization (encapsulation) as methods for handling the waste. Possible effects of leaching are considered. The efficiency and cost of each method are compared.
Plastics In Our Lives[2]	Students investigate various physical properties of plastics, using models to understand the chemical basis for these different properties.
Your Island Factory[2]	Students learn that all chemical processes involve reactants, products, and by-products, and that if specific uses cannot be found for by-products, they must be disposed of as wastes.
Investigating Air Pollution[3]	Students explore basic concepts of air pollution and use an air pump to collect samples of carbon soot in the air.

[1] Published by Addison-Wesley and Lab-Aids.
[2] In process of being published by Addison-Wesley and Lab-Aids.
[3] Being field tested 1990-91.

APPENDIX D

HAZARDOUS SUBSTANCES IN OUR HOME INVENTORY SHEET

Date _____ Name _____

Hazardous Substances in Our Home Inventory

Product	Hazard Classification	Manufacturer	Active Ingredients and/or Warning	Location

Activity One
Part Two

Purpose
You will list and describe hazardous chemicals found at home.

Materials
No additional materials are needed.

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PUBLIC EDUCATION PROGRAM

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
TOXIC SUBSTANCES CONTROL PROGRAM
Mindy Fox

▼ ▼ ▼

ADULT AUDIENCES

▼ Speakers Bureau
Speakers are available for speaking engagements on a variety of topics related to hazardous substances.

▼ Seminars and Conferences
TSCP can assist your agency with seminars and conferences by providing displays and speakers in addition to logistics and advice. We have implemented and or assisted in conferences such as these:

Waste Minimization Conference
Land Disposal Restriction Teleconference
Incineration Roundtable

▼ Brochures and Handouts
Handouts are available regarding hazardous household products, groundwater contamination, what TSCP does, and a citizen's role in the enforcement of hazardous waste issues.

▼ Public Service Announcements
TSCP is releasing PSA's on household toxic products and the role of every individual in the issue of hazardous waste. Watch for them!

▼ Earth Day Outreach
Outreach via classrooms, rallies, museums, civic groups, etc. Interactive presentations encouraged. In 1990 TSCP staff reached 90,000 people statewide.

▼ Train the Trainer
Upon completion of curricula anthology and youth handbooks, TSCP staff will train other educators and facilitators to implement environmental education activities and lessons. *Available Spring and Fall 1991.*

To obtain copies or services described above, please contact the Public Education Coordinator at TSCP by calling (916) 322-0476 or writing to the address below.

State of California Department of Health Services
Toxic Substances Control Program
P.O. Box 942732 • Sacramento • California 94234-7320 • (916) 322-0476

PUBLIC EDUCATION PROGRAM

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
TOXIC SUBSTANCES CONTROL PROGRAM

▼ ▼ ▼

The California Department of Health Services, Toxic Substances Control Program is implementing a public education program for all ages. The mission of the program is to educate the general public regarding hazardous waste and related topics; thereby encouraging a better stewardship of the earth and a more informed decision-making public.

The description below provides a short summary of the public education products available for both students and adults.

STUDENTS (K- College)

▼ **Environmental Education Anthology**
An anthology of activities from a variety of sources nationwide. Activities address solid and hazardous wastes; waste reduction; risk and conservation. *Available Spring 1991.*

▼ **Youth Activity Books**
A series of books on environmental topics for the non-traditional educational setting (youth groups such as 4H, Boy Scouts, Camp Fire Girls, etc.) The first handbook is on Household Chemicals. *Available Spring 1991.*

▼ **Mobile Exibit**
A hands-on exhibit consisting of several stations where participants manipulate displays regarding chemicals, waste and choices. This is currently in the brainstorming phase only. *Available date unknown.*

▼ **Computer Game**
An interactive computer game allowing students to make decisions regarding disposal options and environmental repercusions of household chemicals. *Available late Spring/early Summer 1991.*

▼ **Earth Day**
A statewide outreach effort of TSCP staff implementing a variety of activities ranging from tree planting to sample landfill construction.

▼ **Classroom Presentations**
Presentations for K thru 12 graders on chemicals in our lives; natural resources and recycling and NIMBY.

California Integrated Waste Management Board's HHW Public Information Program

Brenda Saldana

Household Hazardous Waste (HHW) management experts generally agree that improper use and disposal of HHW is dangerous to human health and the environment. However, most of the general public remains uninformed and thus contributes to the increasing amount of HHW entering solid waste landfills, groundwaters, sewers etc.

Governmental agencies, recognizing the seriousness of the HHW problem, have joined with other local groups to develop methods to eliminate or at least decrease the amount of HHW that is illegally disposed. As a result, collection programs of all types have been developed--permanent facilities, mobile collection units, periodic collection days--to provide safe disposal options for HHW generated by the public. These programs are extremely costly and somewhat difficult to manage.

Clearly, the public needs to learn the consequences of careless disposal, overbuying, and the hazardous content of many products on the market. Educating and encouraging people to purchase less toxic products, to purchase only the amount needed, and to properly dispose HHW means less pollution to our environment and less HHW requiring costly disposal.

The goal of the California Integrated Waste Management Board's (Board) HHW Public Information Program is to not only provide consistent information on the proper use and safe disposal of HHW to the general public, but to also make this material available to local groups to incorporate into their own public information programs. In order to achieve that goal, Board staff has drafted a proposal, along with a request for funding, to expand the existing HHW Public Information Program. The proposal includes developing children education activity packets, informational factsheets and booklets for the

adult community, specialty items, and mobile displays. All material will be developed in both English and Spanish, and all material will be available in camera-ready form.

Currently, the following HHW public information materials are available from the Board:

1) factsheets on used oil, antifreeze, latex paint, oil-based paint, aerosols, and lead acid batteries;
2) a brochure which gives general information on what HHW is, how it should be handled, and some examples of safer alternatives;
3) a public service announcement (PSA) which is aired on television stations throughout California. The PSA describes the dangers of HHW and displays the Board's toll-free hotline number; and
4) a toll-free hotline number which provides the public with information on how to properly dispose HHW and locations of any collection programs within a specific area.

All of the written HHW material has been translated into Spanish and is available upon request.

Existing material as well as any future materials will not only be used by Board staff to provide information to the general public, but also be available to local agencies and groups. By providing assistance and materials to local agencies and groups as much as possible, the Board's HHW Public Information Program will educate a much larger audience. This, in turn, will increase public awareness of the potential dangers of HHW and, hopefully, decrease the amount of HHW that is illegally disposed.

HHW Conference - San Francisco

Public Information & Education

"You're Never Too Young To Learn"

Carol May Sherman

Introduction:

VERY OFTEN, WE ASSOCIATE HHW WITH "GROWN-UPS"- - ADULTS, BUT IN REALITY WE CAN'T DO THAT. OUR YOUNG FUTURE GENERATIONS WILL BE FAR MORE AFFECTED THAN US IF WE DO NOT CURTAIL OUR IRRESPONSIBLE HABITS IN THE USE OF HOUSEHOLD HAZARDOUS MATERIALS AND THE PROPER DISPOSAL OF IT. WE NEED TO ACQUAINT OUR YOUTH WITH HHW AS WELL.

SLIDES

(1) " YOU'RE NEVER TOO YOUNG TO LEARN about HHW "

AS WITH ANY OF OUR HABITS, THEY ARE ESTABLISHED EARLY ON IN LIFE. IF WE LEARN A PROPER PROCEDURE IN DOING SOMETHING AT THE BEGINNING, IT TENDS TO FOLLOW US THROUGHOUT OUR LIFE. CONVERSELY, WHEN WE LEARN IMPROPER HABITS, THEY TOO WILL FOLLOW US - AND THEN THE LEARNING PROCESS OF REVERSING THAT HABIT IS TWICE AS DIFFICULT.

THE SCHOOLS TODAY ARE TEACHING MANY SUBJECTS BEYOND THE BASIC - 'READING, 'RITING, AND 'RITHMETIC'. OUR CHILDREN ARE LEARNING THE CONSEQUENCES SMOKING, OR ILLEGAL DRUGS CAN CAUSE. THEY ARE UNDERSTANDING EARLY THAT THESE SUBSTANCES CAN BE HARMFUL TO THEM AND THEY NEED TO ESTABLISH HEALTHY HABITS THROUGH NOT USING THEM.

SO IT CAN BE WITH OTHER SUBSTANCES SURROUNDING THEM—

AND IN THIS SCENARIO, ITS HOUSEHOLD HAZARDOUS WASTES. THIS CONCERN BECAME A PRIMARY FOCUS FOR OUR COMPANY, GRASS VALLEY DISPOSAL, INC. IT'S A SMALL PRIVATE WASTE HAULING & RECYCLING COMPANY IN THE FOOTHILLS OF CALIFORNIA. GRASS VALLEY IS A GOLD COUNTRY COMMUNITY IN NEVADA COUNTY.

OUR COUNTY BEGAN THEIR HOUSEHOLD HAZARDOUS WASTE COLLECTION DAYS IN 1986. (THIS IS A flyer they used to publicize it.) AS THE COUNTY'S FRANCHISED PRIVATE HAULER, WE WERE ASKED TO PARTICIPATE IN THE PLANNING AND ADVERTISING OF THIS EVENT. BECAUSE OUR COMPANY HAD STARTED A MAJOR PUBLIC AWARENESS PROGRAM FOR OUR COMMUNITY, THIS FIT IN VERY WELL WITH OUR PLANS. WE HAD ALREADY STARTED AN AGGRESSIVE SCHOOL PRESENTATION PROGRAM, SO THE HHW COLLECTION DAY WAS MELDED RIGHT IN.

WE CONTINUED OUR NEWSPAPER PUBLIC AWARENESS ADS, EXPLAINING THE DANGERS OF HHW AND WHAT PEOPLE CAN DO TO HELP. WE PUT NOTICES IN OUR BILLS TO CUSTOMERS. WE DISBURSED FLYERS FROM OUR OFFICE AND AT PUBLIC PRESENTATIONS TO COMMUNITY GROUPS AND SCHOOLS, AND even SENT LETTERS TO ~~ALL OF OUR COMPANIES~~ each individual customer WITH A LIST OF HAZARDOUS WASTES TO LOOK FOR. WE CREATED A RED TAG THAT OUR DRIVERS PUT ON CANS WHEN HHW IS FOUND IN THEM. THE HAZARDOUS WASTE IS PULLED OUT AND SET ASIDE. THE YELLOW CARD IS FOR NEW CUSTOMERS TO EXPLAIN ABOUT HHW AND WARNING THEM NOT TO PUT IT IN THEIR TRASH. ALL OF THESE PROCESSES LED TO OUR ULTIMATE

EDUCATION OPERATION - A PUBLIC EDUCATION/INFORMATION DIVISION - AND FINALLY, A SUBSIDIARY COMPANY, REFUSE INDUSTRY PRODUCTIONS, INC., OR "RIPI".

(9) WE INITIALLY PRODUCED A VIDEO - 'GARBAGE IN AMERICA - THE CHOICE IS OURS', WITH A STRONG FOCUS ON HHW. IT ALSO HAS A 30 SECOND PSA OUR LOCAL T.V. STATION CAN RUN ON THE UP AND COMING HHW DAYS TO PUBLICIZE IT.

(10) AND THEN A CURRICULUM WAS DEVELOPED, COPYRIGHTED, AND PRINTED. IT IS A K-12 MINI-CURRICULUM, HAVING AN INDIVIDUAL PACKET FOR EACH GRADE. HHW IS ADDRESSED (11) STARTING IN THE 4TH GRADE WITH 'THE HORRIBLE HEAP'. THIS DEALS WITH ~~THERE ARE~~ SIMPLE AND EASY TO LEARN CONCEPTS, DEVELOPING INTO SOMEWHAT 'HANDS-ON' PROJECTS LIKE CHECKING OUT THE HOME USING A CHECK-OFF SHEET AND FOLLOWING UP WITH PROPER (12) DISPOSAL, OR ALTERNATIVE USES. (THIS IS A LESSON FROM OUR 7TH GRADE) SIMILAR TYPE PAGES ARE INCLUDED IN THE UPPER GRADES AS THEY PROGRESS, WITH A BIT MORE (13) SOPHISTICATED INFORMATION INCLUDED. THE USE OF SAFE ALTERNATIVES IS AGAIN EMPHASIZED.

(14) OUR SECOND VIDEO, 'HAZARDOUS WASTE - PRIORITY ONE', COULD ALSO BE USED IN THE UPPER GRADE CLASSES, AS WELL AS THE ADULT GENERAL PUBLIC. ~~BUT~~ BUT WE DIDN'T STOP THERE.

USING MATERIAL FROM OUR CURRICULUM, WE DEVELOPED A VERY SIMPLE HHW BROCHURE TO EDUCATE THE GENERAL PUBLIC.

(15) (SHOW) I'VE SPREAD OUT THE BROCHURE TO SHOW THE OUTSIDE AND INSIDE FOR YOU. ('IF ANYONE WOULD LIKE A SAMPLE, LEAVE A CARD AND I'LL GET ONE TO YOU.)

WE FEEL THAT IF A 'HANDS ON' PROJECT CAN WORK FOR THE STUDENTS, WHY NOT SUPPLY SIMILAR MATERIAL FOR ADULTS? MANY ADULTS NEVER HAVE CONTACT WITH SCHOOL MATERIALS, AND LEARNING NEEDN'T STOP AT GRADUATION.

SO OFTEN WE PUT OUT VERY DETAILED, TECHNICAL INFORMATION WITH LOTS OF WORDING, AND PEOPLE JUST QUICKLY LOOK AT IT WITHOUT GETTING ANY MESSAGE FROM IT. WE ARE TRYING TO SEE IF A VERY SIMPLE, GRAPHICALLY DONE PIECE OF MATERIAL WILL WHET THE INTEREST AND CAUSE PEOPLE TO BE CURIOUS - like "DO I HAVE ANY OF THESE IN MY HOME?" RAISING THE CONSCIOUSNESS LEVEL IS PRIMARY AT THE BEGINNING. THEN WE CAN GO ON TO MORE DETAILED INFORMATION.

THESE BROCHURES ARE HANDED OUT AT SPECIAL EVENTS, SUCH AS THE COUNTY FAIR, MUSIC FESTIVALS, SCHOOLS, COMMUNITY ORGANIZATIONS, OUR COMPANY'S COUNTER, AND WILL BE AT THE COUNTY OFFICES' FRONT COUNTER.

I'M NOW WORKING ON A YOUNG CHILDREN'S HHW BOOKLET SO WE CAN BEGIN THE LEARNING/AWARENESS PROCESS EVEN EARLIER. I'VE DISCUSSED THIS WITH OUR COUNTY'S HW TASK

FORCE (THEN WE WILL TALK ABOUT THE 'BAD GARBAGE' AROUND US!) RIGHT NOW, OUR STORY COLORING BOOK HAS A PAGE ABOUT (16) HHW FOR THE YOUNGER CHILD. OUR STICKERS EVEN HAVE A HHW DESIGN INTEGRATED IN THE SHEET (NOTE THE SAD CAN).

AS A PRIVATE HAULER, WE'RE VERY PROUD OF WHAT WE ARE ACCOMPLISHING. WE KNOW THE IMPORTANCE OF ELIMINATING THE HHW FROM OUR WASTE STREAM. IT IS PARAMOUNT THAT WE PRACTICE SAFE AND EFFECTIVE DISPOSAL PROCEDURES. OUR (17) EMPLOYEES' SAFETY ON THE TRUCKS IS VERY IMPORTANT TO US. THE RED TAGGING OF DISCOVERED HHW NOT ONLY PROTECTS THEM BUT CONTINUALLY INSTILLS THE AWARENESS OF THE NEED TO GET IT OUT OF THE WASTE STREAM. THEY ARE, IN EFFECT, ANOTHER OUTREACH TO THE PUBLIC. AND SO THE AWARENESS GOES ON.

WE WOULD ENCOURAGE OTHER PRIVATE ENTITIES, IF THEY'RE NOT DOING IT NOW, TO BECOME INVOLVED WITH THEIR LOCAL PUBLIC AGENCY IN HELPING INFORM THEIR COMMUNITY OF THE NEED FOR REDUCING, IF NOT ELIMINATING, HHW FROM IT'S TRASH. IT'S OF BENEFIT TO ALL INVOLVED. A CLEAN AND HEALTHY COMMUNITY IS A STRONGER COMMUNITY. AND TO GET TO THAT POINT, WE WILL NEED THE PUBLIC'S SUPPORT.

THE MORE WE CAN INFORM THEM,- THE BETTER WE CAN INFORM THEM,- THE MORE THEY WILL UNDERSTAND AND HELP US MAKE IT ALL HAPPEN. AND OUR YOUNG PEOPLE NEED TO BE A PART OF THAT PICTURE because - 'YOU'RE NEVER TOO YOUNG TO LEARN".

PUBLIC EDUCATION AND INFORMATION PROGRAMS RELATING TO HOUSEHOLD HAZARDOUS WASTE MANAGEMENT

BY MARK DEFRANCES, COMMUNICATIONS MANAGER, CHEMICAL WASTE MANAGEMENT, INC. ORGANICS GROUP, AZUSA CALIFORNIA

On seeing a glass of water that's filled halfway, an an optimist might say it's half full, a pessimist might say it's half empty, but a Californian will say it's contaminated.

Yes, as most of us already know, Californians are acutely aware of the hazards that face the environment that we all share. That fact is borne out in the amount of environmental initiatives that were on the ballot yesterday in the general elections. The results of the balloting show, at the very least, that not only are Californians aware of the importance of environmental issues but they are environmentally knowledgeable.

That knowledge must come from somewhere. Certainly the media and environmental groups supply some of the information. Just as certainly, federal, state and local agencies, county and city representatives, and private industry represented here today at the Fifth Annual Household Hazardous Waste Management Conference also supply information.

I'd like to offer for your consideration, what Chemical Waste Management, Inc., is doing in the way of public education relevant to managing household hazardous wastes. Our parent company, Waste Management, Inc through Waste Management of North America is the nation's largest provider of recycling collection programs. The company has recognized this important public trend and developed its Recycle America services to meet the needs of its municipal and commercial customers.

2-2-2 Public Education & Information Programs - HHW

At the same time, our company has recognized the need for household hazardous waste collection and disposal to prevent that waste from getting into municipal solid waste landfills. A household hazardous waste collection is a high profile event in the community. By organizing a collection program, we can help families rid their homes of dangers, and help keep waste collection and disposal employees safer. Even bettter, we can make that collection program into an on-going household hazardous waste system to improve a community.

An perhaps most importantly, we can build awareness of the vital need to handle and dispose of hazardous materials properly. An informed, involved community provides a healthy environment for growth and business opportunities. And that enhances the community image.

Well planned and executed public education and publicity programs are the key to the success of a household hazardous waste program. These activities should begin at least two to three months prior to the event. It is also a perfect opportunity to educate the public on other environmental issues. Your contractor should be equipped to assist with the preparation and placement of all publicity materials including flyers, trash can hangers, water or garbage bill inserts, informational brochures, newsletters, newspaper ads, press releases, public service announcement and questionaires. The contractor should also provide an expert to assist in addressing civic groups and conducting informational radio and TV news/talk shows.

Another facet of a comprehensive hazardous waste management public information program is achieved through contact with the formal education system through groups such as CEPUP and CAER. Chemical Waste Management is heavily involved in Doctor Thier's CEPUP program, not only financially, but through representation on the board of directors. Community Awareness and Emergency Response (CAER) groups are excellent forums for environmental education efforts. Presentations at local schools are another way to further educate and inform our communities.

3-3-3 Public Education & Information Programs - HHW

Chemical Waste Management Western Region has produced two informational public service videos on household hazardous waste and is talking to television stations throughout the state about showing them.

Additionally, this past year we participated in the first-ever pesticide collection day in Kings and Tulare County. This agricultural waste collection event was very successful and included a comprehensive information and education program. Our Kettleman Hills Community Relations manager produced a pesticide collection guideline booklet that included a large section devoted to education, information and publicity for this special event.

There are many innovative ways to educate and inform the various audiences we need to reach in helping the public understand hazardous waste issues, in general, and household haazardous waste management, in particular, and how communities can make a difference. Chemical Waste Management is committed to that help. Thank you.

ISSUES AND APPROACHES TO THE EXPANSION OF A PERMANENT HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAM, THE SAN FRANCISCO PERSPECTIVE

Paula Kehoe and Bill Quan
Office of the Chief Administrative Officer
Solid Waste Management Program
City and County of San Francisco

The permanent Household Hazardous Waste Collection Facility in San Francisco is now entering it's third year of operation. The facility enables San Francisco residents to bring their household hazardous waste, free of charge, 3 days a week. During 1988, the first year of operation, over 3,000 residents participated, and in 1989, 4,500 participated. During 1990, the City anticipates serving over 6,000 residents, doubling participation from the first year.

With great success behind us, we are in the process of expanding our Household Hazardous Waste Collection Facility by hosting a one day collection event. In addition, we have been developing used oil recycling proposals and designing a household battery recycling program.

One Day Collection

The location of the facility is not convenient for some resident, and since the facility is not easily accessible by public transportation, we are planning a one day collection to be held in the spring. The one day event will be held in an area approximately 13 miles from the permanent facility in a well-populated residential area.

The one day collection will be co-sponsored by Sanitary Fill Company, who is providing the services free of charge to the City and County of San Francisco. The City will be advertising the collection day through the neighborhood organizations and bill inserts.

Used Oil Recycling

Because of the concern of the illegal disposal of used crankcase motor oil and its serious environmental consequences, the City and County is eager to have more used oil collection sites available for the public.

When used oil is disposed of in our combined sewer/storm drain system, many problems are caused at the treatment facility. When oil is formulated, additives containing zinc are formulated into oil. Engine wear metals such as chromium and copper end up in

used oil. Additionally, zinc is normally found in used oil as it is used in the formulation of the virgin oil. All these metals are regulated as EPA priority pollutants. Because of the City's combined sewer/storm drain system, moderate levels of used oil in the wastewater can pose problems at the City's treatment plant.

A major reason for the illegal dumping is the low number of facilities that are available and convenient for the public. Aside from the Household Hazardous Waste Collection Facility, there are only 9 service stations out of 154 stations in the City willing to accept used oil from the public for a fee. However, most of the public is unaware of this service due to the lack of advertising.

The few numbers of used oil collection facilities can be attributed to facility owners fear of other hazardous waste mixed in with the used oil. Some owners feel it is bad business to charge for the collection of used oil, and, the empty containers pose problems upon disposal, as well. Because of the City's hilly terrain and its windy weather, it is a difficult problem to develop containers suitable for use in the City's curbside program. As a result, the City and County of San Francisco is unable to establish a curbside recycling system for used motor oil at this time.

The City has found, that despite the lack of facilities, the public is interested in the proper management of used oil. Also, in a recent study conducted at 50 service stations in the City and County of San Francisco, virtually all stations indicated interest in the recycling of used oil. In addition, the Solid Waste Management Program receives numerous calls on a weekly basis inquiring used oil recycling locations.

The City has identified potential collection sites for the disposal of householders used oil: service stations, recycling centers, and retail stores. The Department of Health Services (DHS) has indicated used oil that is collected from conditionally exempt small quantity generators and householders are exempt from RCRA hazardous waste regulations and can be managed as a state regulated used oil, even if it is contaminated.

In a letter to the City, DHS stated that when used oil from households and used oil that is generated by stations performing customer's oil changes are mixed, the exemption is void if the oil is indeed shown to be contaminated. Specifically, if used oil is shown to contain more than 1,000 parts per million total halogens, the used oil must be transported to a RCRA hazardous waste permitted facility.

Service stations, recycling centers, and retail outlets that accept used oil re still liable for the proper management of the used oil, according to DHS. Also, there businesses should have EPA generator identification numbers (i.d.). In the case of

service stations, they probably have EPA generator i.d. numbers, since they have been traditionally regulated as generators of hazardous waste.

The cost of operating a collection site is expensive. For example, the cost of a 500 gallon above ground tank for the storage of used oil is approximately $3,500. Also, in the City, a permit is required for a hazardous waste storage tank or container, which costs approximately $400 (the permit fee is waived for non-profit organizations).

In addition to the costs associated with storage, the transportation and disposal of used oil can be costly. Used oil from large quantity generators that is not contaminated or used oil from exempt small quantity generators, even if it is shown to be contaminated, is considered a state regulated used oil. A state regulated used oil costs roughly 25 cents per gallon for transportation and recycling. Used oil from large quantity generators that is contaminated is classified as RCRA hazardous waste and costs $2.25 a gallon for transportation and disposal. Service station used oil commingled with householders used oil is considered a waste that has been generated by a large quantity generator.

In conclusion, to ensure proper management of used oil, the costs have been placed on facilities willing to collect used oil. The City will be working with service stations, recycling centers and retail stores to see if they can financially afford the collection of used oil and the liability associated with the collection of used oil. In addition, we have contacted two major oil companies, Shell and Chevron, requesting their assistance with independent dealers to establish used oil collection points. Shell has developed used oil collection programs outside California, most notably in Florida, and more recently they have approached San Diego County with a used oil collection proposal, whereby they would supply the above ground storage tanks to their independent dealers. The City hopes additional used oil collection points will be available for the public, thereby increasing recycling efforts in the near future.

Household Battery Collection Program

We have been interested in the removal of household batteries from the solid waste stream for a few years now. Removing recoverable resources and potential pollutants from the waste stream has lead us to explore the development of a household battery collection program.

The task of finding safe and reliable battery recycling firms was, to say the least, a frustrating experience. Initially, we identified three potential markets in California. Upon reviewing their permit files we have immediately rejected two of the three firms.

The City now plans to collect silver oxide and mercuric oxide batteries at its Household Hazardous Waste Collection Facility. The City hopes to arrange with ECS Refining in California to receive the silver oxide batteries to recover the silver and with Mercury Refining in New York to receive the mercuric oxide batteries to recover the mercury. In addition, the City plans to accept the nickel cadmium (Ni-Cad) batteries. The City is in the process of negotiating with Bronx 2000 to be the recipient of the Ni-Cad battery, pending clarification of the regulations and issues concerning liability. The Ni-Cad batteries would be sent to a processing facility in France for the recovery of the nickel as ferrous nickel and the cadmium as 99.95% cadmium.

With the recent legislation in California, it is our hope that new markets will develop, both facilitating collection programs and the recovery of reusable resources. For example, according to SB 1594, passed in September of 1989, a collection location or intermediate collection location can accept batteries without a variance or permit from DHS if the site does not store more than 200 lbs. of batteries at any one time and no batteries are stored for longer than 180 days.

With the past few months dedicated to researching the possibilities of expanding our Household Hazardous Waste Collection Facility, we believe our projects will be implemented in the near future. By our sharing our experiences with you, we hope to provide insight into the issues concerning the development of such programs. Overall, establishing a used oil recycling collection program and a household battery collection program requires perseverance. And, despite the trials and tribulations, we feel these programs will contribute to an increased public awareness of household hazardous wastes and provide the measures to help protect our environment.

Appendix I

Final Program

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U.S. ENVIRONMENTAL PROTECTION AGENCY

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

NOVEMBER 5-7, 1990 SAN FRANCISCO, CALIFORNIA

FINAL AGENDA

SUNDAY, NOVEMBER 4, 1990

3:00 p.m. - 5:00 p.m. **Registration** *Front Hall*

7:30 p.m. - 9:00 p.m. **Informal Social Hour** *Crystal Ballroom*
Reception with Cash Bar & Clogging

MONDAY, NOVEMBER 5, 1990

7:00 a.m. - 8:30 a.m. **Registration** *Front Hall*

8:30 a.m. - 10:00 a.m. **Plenary Session** *Goldrush B*

Moderator: Michael Flynn
Greetings from the City: Mayor Art Agnos, City of San Francisco, CA
Greetings from the Department of Health Services: John Kearns, DHS, CA
Greetings from the California Integrated Waste Management Board:
George Larson, CIWMB, CA
Keynote Address: Sylvia Lowrance, OSW, U.S. EPA
Where We Are, Where We're Going: Dana Duxbury, DD&A, MA
Setting Goals, Evaluating Progress: David Galvin, Seattle Metro, WA

10:00 a.m. - 10:30 a.m. **Break**

10:30 a.m. - 12 noon **Plenary Session** *Goldrush B*
Integrating HHWM With Solid and Wastewater Management: Dana Duxbury, DD&A, MA and David Galvin, Seattle Metro, WA
European HHWM Activities: Gerhard Vogel, University of Economics, Vienna, Austria
Cleaning Up Toxics At Home (Video): Carole Wagner Vallianos, LWV, CA
Nancy Kramer Bickel, LWV, CA

12 noon - 1:00 p.m. **Lunch** (by prior registration) *Emerald Ballroom*

1:00 p.m. - 1:30 p.m. **Live Demonstration of Incompatibles:** *Pool Deck - 6th Floor*
Larry Sweetser, NORCAL, CA

1:30 p.m. - 5:00 p.m. **Plenary Session** *Goldrush B*

Moderator: Dana Duxbury
Source Reduction Overview: Michael Flynn, OSW, U.S. EPA

Product Evaluation Panel
A Product Evaluation Procedure: Philip Dickey, WA Toxics Coalition, WA
Consumer Product Safety Commission's Evaluation Process: Lee Baxter, CPSC
Life Cycle Analysis: Susan Mooney, OSW, U.S. EPA
Targeting Chemicals: Larry Longanecker, OTS, U.S. EPA

3:00 p.m. - 3:30 p.m. **Break**

Green Cross's Product Evaluation Process: Jim Knutzon, Green Cross, CA
Green Seal: Denis Hayes, Green Seal, CA

Labelling Panel Overview
Overview of Labelling Programs: Sharon Stahl, OPPE, U.S. EPA
Canada's Environmental Choice Program: Valerie Douglas, Environment Canada

8:30 a.m. - 5:00 p.m. **DISPLAY ROOM:** Educational, Publicity and Audio-Visual Materials *Crystal Room*

5:30 p.m. - 6:30 p.m **Reception (Cash Bar)** *Emerald Ballroom*

6:45 p.m. - 8:00 p.m **Recycle This (Laser & Music Show)**
Horace Mann Middle School School, 3351 23rd Street
(Bus will leave from Front Lobby)

TUESDAY, NOVEMBER 6, 1990

7:00 a.m. - 8:25 a.m. **Networking Breakfast for Rural HHW Programs**
Room next to restaurant

8:30 a.m. - 10:00 a.m. **Concurrent Sessions**

I. A. HOW-TO/PLANNING *Washington*

Moderator: Ned Brooks
Defining the Problem: David Galvin, Seattle Metro, WA
The Public's Views on HHW: Shirley Niemeyer, University of Nebraska, NE
Getting Started/Education/Publicity: Joan Dotson, LWV, CA
Types of Programs: Gina Purin, NORCAL, CA

I. B. USED OIL *Goldrush B*

Moderator: Robert Amer
EPA Overview: Ron McHugh, OPPE, U.S. EPA
Federal Legislation: Fran McPoland, Rep. Esteban Torres' Office, DC
Management Options: Alan Gressel, Research Oil Co., OH
Education Programs: Janet Graham, Project ROSE, University of Alabama
Curbside Collections: Joyce Hlava, Browning Ferris Industries, CA
Industry's Used Oil Programs: Carl Gerster, Mobil Oil, VA

I. C. SOURCE REDUCTION *Redwood*

Moderator: Fernando Berton
How to Achieve Toxicity Reduction: Shirli Axelrod, City of Seattle, WA
Where the Opportunities Are and Product Comparisons: Philip Dickey, Toxics Coalition, WA
A New Source Reduction Project: Mary Ann Curran, ORD, U.S. EPA
Developing a Community Program: Richard Conlin, YMCA, WA
OTS's Product Stewardship Program: Larry Longanecker, OTS, U.S. EPA
Industry Efforts: Soonya McDavid, CSMA, DC

I. D. EDUCATING THE PUBLIC FOR BEHAVIORAL CHANGE *Goldrush A*

Moderator: Cynthia Fridgen
Vermont's Shelf Labelling Program: Michael Bender, Cnt. VT Reg. Planning Cmt., VT
Marketing Strategies: Richard Wells, ABT Associates, MA
Media Education: Nancy Kramer Bickel, LWV, CA
Creating Dissonance and Capitalizing on It: James Grieshop, Univ. of CA, Davis, CA

I. E. ONE DAY COLLECTION PROGRAM CASE STUDIES *Nevada*

Moderator: Donna Portner
Pasadena's Program: Joesph Reilly, Los Angeles County, CA
Amnesty Days: Jan Kleman, DER, FL

I. F. DISPLAY ROOM: Educational, Publicity and Audio-Visual Materials *Crystal*

10:00 a.m. - 10:30 a.m. **Break**

10:30 a.m. - 12:00 noon **Concurrent Sessions**

II. A. HOW TO *Washington*

Moderator: Sharon Rehder
Liability: John Fogarty, Office of Enforcement, U.S. EPA
Do RCRA Regulations Apply to HHWM: Becky Cuthbertson, OSW, U.S. EPA
Identifying Unknowns: Tom Watkins, NORCAL, CA
Permitting/Plan Approval: Judi Frantz, DHS, CA

II. B. PESTICIDES *Nevada*

Moderator: Sondra Goodman
EPA Overview: Tracy Bone, FIFRA, U.S. EPA
Manufacturer's Views of Farm Pesticide Disposal Uses: Ralph May, Dupont, DE
Farm Pesticide Collection Programs: Charles Cubbage, Department of Agriculture, MI
Reducing the Use of Home and Yard Pesticides: Sheila Daar, BIRC, CA

II. C. PAINT *Goldrush B*

Moderator: Gina Purin
Overview of Collection and Management Methods:
Dana Duxbury, DD&A, MA
Philip Morley, Morley & Associates, MA
EPA's Concerns — Lead, Mercury, and PCB's: Susan Mooney, OSW, U.S. EPA
NPCA's Program: Barbara Walz, NPCA, DC
California's Paint Task Force: Steve Depetris, DuFour Environmental and Resources Management, CA

II. D. EDUCATION (continued) *Oregon*

Moderator: Michael Frishman
Developing a County Education Program with Emphasis on Public Schools: Liz Gelbmann, MPCA, MN
Community Education and Action: Sarah Dewey, SW Missouri State University, MO
Community Education and Leadership Development: Cynthia Fridgen, Michigan State University, MI

II. E. DISPLAY ROOM: Educational, Publicity and Audio Visual Materials *Crystal*

12 noon - 1:30 p.m. **Lunch** (by prior registration) *Emerald Ballroom*

1:30 p.m. - 3:00 p.m. **Concurrent Sessions**

III. A. HOW TO *Washington*

Moderator: Joan Dotson
Waste Types and Management: Judy Orttung, San Bernardino, CA
Impact on Costs: LeeAnn Merashoff, Laidlaw Environmental Services (Northeast), MA
RFP's and Contracts: Liz McCormick, Laidlaw Environmental Services, SC
Budgets: Emy Chan Meiorin, ABAG, CA
Funding Sources: Kathleen Warren, Bureau of Air and Waste Management, KS

III. B. HEAVY METALS *Redwood*

Moderator: Nancy Misra
Sources of Mercury in MSW: Marjorie Franklin, Franklin Associates, KS
Lead Acid Battery Collection and Management: Richard Godber, Trojan Battery Co., CA
One Company's Program: Terry Telzrow, Eveready Battery Co., OH
The Battery Products Alliance: William Hill, Black & Decker, MD

III. C. PAINT (continued) *Goldrush*

Moderator: Gina Purin
Drop and Swap: Jack Wolfin, Snohomish County, WA
Seattle Update: Philip Morley, Morley & Associates, WA
Canada's Paint Program: Claudia Marsales, Laidlaw Environmental Systems, Ltd, Canada
Major Paint's Recycling Program: Arnold Hoffman, Major Paint, CA
San Mateo County's Paint Collection Program: Rick Miller, San Mateo, CA

III. D. MOBILE COLLECTIONS *Oregon and Nevada*

Moderator: Ned Brooks
Permanent Facility —
King County: Henry Draper, King County, WA
Riverside County: Mike Shetler, Riverside County, CA
Tailgate —
Klickitat County: Frank Ensell, Klickitat County, WA

III. E. DISPLAY ROOM: Educational, Publicity, and Audio Visual Materials *Crystal*

3:00 p.m. - 3:30 p.m. **Break**

3:30 p.m. - 5:00 p.m. **Concurrent Sessions**

IV. A. HOW TO *Washington*

Moderator: Karen Feeney
Health and Safety (Pitfalls): Larry Sweetser, NORCAL, CA
Personnel/Training: LeeAnn Merashoff, Laidlaw Environmental Services (Northeast), MA
Site Selection: Eric Laut, Chemical Waste Management, IL
Load Checking: Cedar Kehoe, Sanitary Fill Co., CA

IV. B. HEAVY METALS (continued) *Redwood*

Moderator: Marie Steinwachs
Legislation and Studies: Nancy Misra, MPCA, MN
Overview of Dry Cell Battery Collection Programs: Nancy Zahedi, OSW, U.S. EPA
Implementation Issues for Collection Programs: Don Seeberger, Consultant, WA
Management of Collected Dry Cell Batteries: David Hurd, South Bronx 2000, NY

IV. C. PERMANENT HHW PROGRAMS OVERVIEW *Goldrush B*

Moderator: Joe Johnson
Overview: Dana Duxbury, DD&A, MA
Planning and Design Criteria: Ned Brooks, MPCA, MN
Permit/Plan Approval: Sharon Rehder, DEC, NY
Waste Management at Permanent Facilities: Diane Christensen, San Bernardino, CA

IV. D. HHW AND WASTEWATER *Oregon and Nevada*

Moderator: Judi Frantz
Overview: David Galvin, Seattle Metro, WA
HHW and Sewage Treatment Plants: Hitesh Nigam, OMPC, U.S. EPA
Carolyn Nunley, ERM, PA
HHW in Septic Systems: John Kolega, University of Connecticut, CT
Developing a Coordinated Wastewater Management Program: Frank Filice, San Francisco, CA
Contribution of Heavy Metals to Wastewater from Cleaning Products: Larry Russell, Reed Corporation, CA

IV. E. DISPLAY ROOM: Educational, Publicity and Audio Visual Materials *Crystal*

5:30 p.m. - 8:00 p.m. **Reception** at NORCAL 's Golden Gate facility
(Bus will leave from front door)

WEDNESDAY, NOVEMBER 7, 1990

8:30 a.m. - 10:00 a.m. **Concurrent Sessions**

V. A. PERMANENT FACILITY CASE STUDIES *Goldrush A*

Moderator: Judy Orttung
Anchorage: Bill Kryger, City of Anchorage, AK
King County: Henry Draper, King County, WA
Palm Beach County: Marc Bruner, Palm Beach County, FL
Sturbridge: George Berry, Sturbridge, MA
Long Island's Comprehensive Program: Robert Arner, Southampton, NY

V. B. ONE DAY COLLECTION PROGRAM CASE STUDIES *Goldrush B*

Moderator: Joan Dotson
A Diverse Corporate Program: Carey Brannan, Paul Hannan, DOW Chemical USA, CA
Alberta Canada's Collection Programs: Jolie Whetzel, Canada
Minnesota Programs: Donna Portner, MPCA, MN
Recyclables Only: Robin Bedell-Waite, Contra Costa County, CA

V. C. HHW WITH CONDITIONALLY EXEMPT SMALL QUANTITY GENERATORS WASTE COLLECTION PROGRAMS *Emerald A*

Moderator: Cedar Kehoe
Vermont's CESQG's: Michael Bender, Central Vermont Regional Planning Committee, VT
Santa Barbara County: Karen Feeney, Community Environmental Council, CA
Anchorage: Larry Wilkinson, Northwest Enviroservice of Seattle, AK
Farm Waste Generator Status: Charles Cubbage, Department of Agriculture, MI

V. D. PLANNING *Oregon and Nevada*

Moderator: Michael Frishman
The Washington Process: William Green, DOE, WA
Seattle's Plan: David Galvin, Seattle Metro, WA
Rural County Plans: Larry McCallum, DOE, WA
A Medium Sized County's Plan: Ron Pepper, Yakima County, WA

V. E. INDOOR AIR POLLUTION AND HHW *Redwood*

Moderator: Gina Purin
EPA's Indoor Air Program: Bob Axelrad, Indoor Air Office, U.S. EPA
Sources and Concentrations: John Girman, DHS, CA
Designing Buildings to Minimize Indoor Air Pollutants: Hal Levin, CA

10:00 a.m. - 10:30 a.m. **Break**

10:30 a.m. - 12:00 a.m. **Plenary Session** *Goldrush*

Moderator: Susan Mooney
Panel: How to Get Manufacturers Involved in HHWM Issues —
Representatives of Different Product Categories: Paint (Barbara Walz), Pesticides (Ralph May), Oil (Don Gilson), Dry Cell Battery (Terry Telzrow), Chemicals (Paul Hannan)
Questioners: Gina Purin, Philip Dickey and Ned Brooks
Future Issues Needing Resolution: Dana Duxbury, DD&A,MA and David Galvin, Seattle Metro, WA
Closing Remarks: Laura Yoshii, U.S. EPA Region 9, CA

12:30 noon - 1:30 p.m. **Lunch** (by prior registration)

California Issues Session

1:30 p.m. - 5:30 p.m. **Plenary Session** *Goldrush A and B*

Moderator: Judi Frantz

1:30 p.m. - 2:30 p.m. **Session A**

Legislation and Regulations

AB 2448 Grant Program: Anna Ward, CIWMB, CA
HHW Component of Source Reduction and Recycling: Fernando Berton, CIWMB, CA
Permit-By-Rule, Periodic Payment: Rubia Packard, DHS, CA
Legislative Update: Dorothy Fettig, Assemblywoman Sally Tanner's Office, CA

2:30 p.m - 2:45 p.m. **Break**

2:45 p.m. - 3:45 p.m. **Session B**

Land Ban: Gary Murchison, DHS, CA
Tanner Siting Process: Christine Kinne, Office of Permit Assistance, Governor's Office, CA
Mobile Collection Units: Linda Pratt, San Diego County Environmental Health Department, CA
Proposition 105: Yvonne Addassi, DHS, CA

3:45 p.m. - 4:00 p.m. **Break**

4:00 p.m. - 5:30 p.m. **Session C**

Public Information and Education

The Importance of Public Education to HHW: Herbert D. Thier, University of California, CA
Department of Health Services Program: Mindy Fox, DHS, CA
CIWMB Program: Brenda Saldana, CIWMB, CA
Industry Program: Carol Sherman, Grass Valley Disposal, CA
Mark DeFrances, Chemical Waste Management, CA
Bill Quan, City and County of San Francisco, CA

5:30 p.m. - 5:45 p.m. **Wrap Up Session: "Meet the State"**

5:45 p.m. - 7:00 p.m. **Reception**

Tours: 1:30 p.m. NORCAL/Sanitary Fill Co. HHW Permanent Facility Tour
(Hotel to Airport **OR** back to Hotel)

6:00 p.m. NORCAL/Sanitary Fill Co. HHW Permanent Facility Tour
(Hotel to Airport)

Bus will leave from front door

THURSDAY, NOVEMBER 8, 1990

Choice of Tours: 9:00 a.m., 12:00 noon, and 4:30 p.m.
NORCAL/Sanitary Fill Co. HHW Permanent Facility Tour
(Hotel to Airport)

Bus will leave from front door

Appendix II

Final List of Speakers

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HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

November 5-7, 1990 — SAN FRANCISCO, CALIFORNIA

List of Speakers

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Source: Dana Duxbury & Associates — January 1991

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Appendix III

Speakers' Biographical Sketches

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U.S. EPA

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

November 5-7, 1990 — SAN FRANCISCO, CALIFORNIA

The Speakers: Brief Biographies

Yvonne Najah Addassi, Proposition 105 Coordinator, California Department of Health Services.

Art Agnos, Mayor of the City and County of San Francisco.

Robert Arner, Recycling Manager, East End Recycling Association, Southampton, NY, has experience in all aspects (but especially used oil) of recycling and pollution prevention, public and private; federal, state, local; hands-on, research, writing, education. He has a BS in Behavioral and Social Science from the University of Maryland.

Robert Axelrad, Director, U.S. EPA Office of Air & Radiation, Indoor Air Division.

Shirli Axelrod, HHW Project Coordinator, Seattle (WA) Solid Waste Utility, deals with "problem wastes" currently concentrating on siting and design of city's second permanent HHW facility. She has a law degree from Northeastern University.

Lee Baxter, Regional Director — Western Region, U.S. Consumer Product Safety Commission.

Robin Bedell-Waite, HHW Coordinator, Contra Costa County (CA) Health Services, has also worked in gerontology and city planning; she earned her MPH and MA (City Planning) from the University of California, Berkeley.

Michael Bender, Central Vermont Regional Planning Commission planner.

George Berry, Chairman, Sturbridge (MA) Board of Health.

H. Fernando Berton, Senior Waste Management Specialist, Manager HHW Management Program, California Integrated Waste Management Board, administers HHW programs. He has a BA in Microbiology and Chemistry.

Nancy Kramer Bickel, Project Manager, Public Education Project on Hazardous Waste Reduction, League of Women Voters of California Education Fund, has been writing and producing award winning television programs for the LWV for 12 years. She has a BA from Swarthmore and an MA from University of California, Berkeley.

Tracy Bone, Microbiologist , U.S. EPA Office of Pesticide Programs, Pesticide Management and Disposal staff, is involved in writing regulations for storage, container design, and disposal of pesticides; she chairs the household pesticide waste committee and co-chairs the group preparing regulations for suspended and cancelled pesticides. She has a masters degree in Environmental Microbiology from Florida State University, has published articles dealing with groundwater microorganisms, and has worked in public and private sectors in aquatic monitoring, sewage treatment, and potable water.

Carey Brannan, Environmental Manager, Western Division, Dow Chemical USA, is involved in waste reduciton, zero discharge and, recycling. He has a BS in Chemistry from the University of Alabama.

Ned T. Brooks, Minnesota Pollution Control Agency, HW Division, in St. Paul, has been working on HHW for the past four years, recent programs include telephone hotlines and waste exchanges. His has worked with environmental issues in private industry, with trade associations and for government.

Marc Bruner, Director of Planning and Environmental Programs, Solid Waste Authority of Palm Beach County, has also worked as a research scientist for the U.S. Department of Agriculture and as an environmental consultant. He earned a PhD at the University of Tennessee, BA and MA at University of Wisconsin.

Diane Christensen, Environmental Health Specialist, San Bernardino (CA) County Health Department, works on HHW program and collection coordination and implementation. She has a BS in Health Science / Environmental Health from California State University, San Bernardino.

Richard Conlin, Project Director Metrocenter YMCA, Seattle, WA, Director of Urban Systems Projects, manages education and publicity for the King County HHWastemobile; consults for and works with City Light Study Group (utility rate watchdog), Puget Sound Water Quality Authority, Seattle Water Supply Plan Development Committee, and the Puget Sound Alliance. He has managed five HHW collections. His MA is in Political Science / Public Administration from Michigan State University, he taught for a year at the University of Botswana and Swaziland, and he was an elected county commissioner in Ingham County, Michigan.

Charles Cubbage, Michigan Department of Agriculture Director Pesticide & Plant Pest Management Division,

works with pesticide collection programs and has extensive experience with groundwater protection including development of educational curricula. He consults on groundwater cleanup projects and is Adjunct Professor at Eastern Michigan University. His doctorate is in water quality and he has developed an inexpensive soil vacuuming technique for removal of volatile solvents.

Mary Ann Curran, Chemical Engineer, U.S. EPA Office of Research and Development, is a Project officer in the Risk Reduction Engineering Laboratory in Cincinnati and manager of the clean products research program. She has been with EPA for 10 years since earning her BS in Chemistry, University of Cincinnati.

Becky Cuthbertson, Environmental Engineer, U.S. EPA Office of Solid Waste, Characterization and Assessment Division, Waste Characterization Branch, develops regulations for pesticide recalls. She has worked at EPA on other regulation development and interpretation projects and holds a BSE in Civil Engineering from Duke University.

Sheila Daar, Executive Director, Bio-Integrated Research Center (BIRC), Has been involved in and published extensively in integrated pest management (IPM) for nearly 15 years. She is editor of *The IPM Practitioner*, *The Common Sense Pest Control Quarterly*, and BIRC publications; she is a former nursery owner, lecturer at the Duttweiler Institute (Switzerland), and editor of Ramparts Magazine. Her BA in Political Science / Horticulture is from University of California, Berkeley, and her MS in Ecosystem Management / Ornamental Horticulture is from Antioch University, West.

Mark DeFrances, Communications Manager, Orgonics Group, Chemical Waste Mgmt., Inc., manages public, media, and community relations programs for CWM western region. He started his public affairs career in the U.S. Air Force, continued as a civilian with the Department of Defense, and also worked at two Superfund sites before joining CWM. He has a degree in Communications/Journalism from California State University, Sacramento.

Stephen Depetris, Manager, San Francisco Region, DuFour Environmental and Resource Management, is a consultant to paint and other industries on environmental and regulatory affairs. He has a BS in Chemical Engineering, BA in Chemistry and an MBA.

Sarah Dewey, HHW Project Manager, Research and Education Specialist, Southwest Missouri State University, develops and presents educational materials on HHW issues to adult and youth audiences. She has a BA from Grinnell College, and MS from University of Miami in Biology.

Philip Dickey, Director, Household Toxics Project, Washington Toxics Coalition, has coordinated "Home Safe Home," an HHW public education program and has produced published material and is working on a database on safe substitute products with health and environmental safety ratings. He is a PhD in Physics, University of Illinois.

Joan Dotson, California League of Women Voters Hazardous Waste Specialist, has long experience on the City of Redlands Planning Commission, also various solid and hazardous waste planning and advisory commissions; is a candidate for election Nov. 6, to the San Bernardino Valley Water District Board.

Valerie M. Douglas, Senior Science Advisor, Environmental Choice (Canada), manages the investigation of scientific, technical, and socioeconomic issues concerning products and recommends policies and program priorities. She is experienced in the management of chemicals throughout their life cycle in the national and international arenas. She has degrees in Chemistry, Biochemistry and Environmental Studies.

Henry Draper, Program Coordinator, King County (WA) Solid Waste Division, has been with the Division for five years and lead the HHW projects -- including HHW Roundups and the "Wastemobile" -- for three years. He has a BS from the University of Wyoming and an MBA from the University of Washington.

Dana Duxbury, founder of Dana Duxbury & Associates, Andover, MA, is an environmental consultant. She specializes in providing policy and educational services in solid and HW management issues to government, industry, and public interest groups. As a Senior Environmental Research Analyst at the Center for Environmental Management, Tufts University, she was active in the area of waste reduction as well as HHW. She worked for 15 years as a volunteer with the Massachusetts and U.S. League of Women voters as a solid and HW specialist and holds a BS in Biology from Cornell.

Frank Ensell, Solid Waste Manager, Klickitat County (WA) Public Works Department, has been a construction manager in Saudi Arabia and a glass blower. He is responsible for a wide range of solid waste management and recycling programs; he holds a BS from the University of Washington College of Architecture.

Karen Feeney, Hazardous Waste Program Manager, Community Environmental Council, Santa Barbara, CA, coordinates five annual HHW collections for households and CESQGs, has written two manuals relating to HHW, and has a BA in Environmental Studies (emphasis Biology) from University of California, Santa Barbara.

Dorothy Fettig, Senior Consultant, California State Assembly Committee on Environmental Safety and Toxic

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Frank V. Filice, Environmental Planner, San Francisco Department of Public Works and Clean Water Program, has a BA in Geography and Recreation from California State University.

Michael Flynn, Acting Chief of the Criteria and Assessment Group, U.S. EPA Office of Solid Waste Municipal Solid Waste Program, with responsibility for work pertaining to municipal solid waste source reduction, land disposal, and residuals from municipal solid waste combustion. He has managed EPA's HHW activities since 1985. He has an MSPH from the University of North Carolina, his BS is from the University of Delaware.

John Fogarty, Enforcement Attorney, U.S. EPA Office of Enforcement and Compliance Monitoring-Superfund, was formerly an attorney with the Environmental Law Institute. He earned his BA and George Washington University and his law degree at New England School of Law.

Mindy Fox, Public Education Coordinator, California Department of Health Services, Toxic Substances Control Program, with the department six years, does outreach work in a variety of waste related projects. She received he BA in Environmental Studies from California State University, Sacramento.

Marge Franklin, President and co-founder, Franklin Associates, has been consulting in municipal solid waste since 1975 and has managed six studies on municipal solid waste characterization for the U.S. EPA. She holds a BS in Aeronautical Engineering from University of Kansas.

Judi Frantz, Associate Hazardous Materials Specialist, California Department of Health Services, Toxic Substances Control Program, is program coordinator for HHW programs and is liaison and technical advisor for northern California counties in the development of their hazardous waste management plans. She has also worked on financial responsibility issues for DHS. She earned her BA at California State University, Sacramento.

Cynthia C. Fridgen, Waste Management Specialist / Assistant Professor Department of Resource Development, Solid and Hazardous Waste Management Education, Michigan State University, works on solid and hazardous waste management issues recently using computer planning techniques. She has published books on solar energy systems, sustainable agriculture and integrated farming systems, and waste management. Her degrees University of California, Davis, are in environmental planning, management and education and community economic development.

David Galvin, Senior Quality Planner, Seattle Metro Water Pollution Control Department, since 1979, has conducted research projects to study source and potential control of toxic and hazardous chemicals in Puget Sound. His has done pioneering studies of toxicants in consumer products and their safe disposal. He majored in biology and environmental studies at Colby College, Waterville, ME, and spent a year working in Europe studying biological indicators of pollution.

Elizabeth Gelbmann, Pollution Control Specialist, Education Coordinator, Minnesota Pollution Control Agency, has a BA in English Literature and Library Science from University of Minnesota.

Carl Gerster, Mobil Oil, Virginia.

Donald Gilson, Senior Environmental Specialist, Chevron, USA, San Francisco, CA.

John Girman, Deputy Manager, California Indoor Air Quality Group, Air and Industrial Lab, California Department of Health Services, has worked with indoor air quality issues relating to commercial buildings, building material emissions, consumer products and has published widely in the field and previously led the group working with these issues at the Lawrence Berkeley Laboratory.. He has a BS in Chemistry, MS in Physical Chemistry.

Rick Godber, President, Trojan Battery Company and Battery Council International Vice President, has a BS in Finance from University of Southern California.

Janet H. Graham, Project ROSE Coordinator (at the University of Alabama) for past five years and Director of the Alabama Waste Exchange, is involved in all aspects of used oil management. She has an M.Ed. from the University of Mississippi.

William P. Green, Environmental Planner, Washington State Dept. of Ecology, coordinates development of 19 local moderate risk (HHW and SQG) plans. He worked in the private sector as a chemist responsible for product development and regulatory affairs and has his MS (University of Washington) and BS (Brigham Young University) in Chemistry.

Alan Gressell, President, Research Oil Co., Cleveland, OH, has been at Research Oil since 1951, BS in Mathematics from John Carroll University.

James Grieshop, Specialist, Community Education, Department of Applied Behavioral Sciences, University of

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Paul Hannan, Waste Minimization Coordinator, Dow Chemical, USA, Pittsburgh, California.

Denis Hayes, Chairman and CEO, Green Seal, Inc., was the International Chairman of Earth Day 1990 and was the Executive Director of the first Earth Day in 1970. He has written and lectured widely on the environment and was Executive Director of the Solar Energy Research Institute during the Carter administration. His undergraduate and law degrees are from Stanford University.

William Hill, Director, Cordless Market and Product Development, Black & Decker (US), Inc., has been with Black & Decker since 1970. He developed and introduced the cordless screwdriver and other high performance cordless products. He earned his BS in Mechanical Engineering at Virginia Polytechnic Institute and his MBA at Loyola.

Joyce Hlava, Community Affairs Manager, Browning-Ferris Industries, in charge of local government relations for BFI's six-state Pacific Region, also serves on the Advisory Committee to the (CA) Assembly Select Committee on Waste Reduction, Reuse, and Recycling. She is former Mayor and member of the City Council of Saratoga; she earned her BA at the University of Michigan.

Arnold Hoffman, Vice President (Retired) / Consultant, Major Paint Company, has over 40 years experience in manufacturing of paint and chemicals and has long been active in hazardous and toxic material management and regulatory issues. He has a BS in Chemistry from Roosevelt College.

David Hurd, Recycling Operations Specialist, South Bronx 2000 Local Development Corporation (Bronx 2000), provides technical assistance in recycling enterprise / program development and is currently working on a consumer drycell battery reclamation project. He is former waste management project coordinator of Environmental Action Coalition. He earned his BE in Chemical Engineering at The Cooper Union.

John J. Kearns, Deputy Director, California Department of Health Services, Toxic Substances Control Program, has been with the state government for 28 years working in health, toxic, and waste issues including a Governor's Task Force. He has a BA in Mathematics and Physics from Duquesne University and worked previously as a research geophysicist.

Cedar Kehoe, HHW Collection Facility Manager, Sanitary Fill Co., San Francisco is responsible for all aspects of operating, managing, and assuring compliance at the facility. Her BA and MS are from University of Hawaii in zoology and she has hazardous waste management certification from the University of CA, Davis.

Christine Kinne, Assistant Chief, Office of Permit Assistance, Governor's (CA) Office of Planning and Research, supervises all operations of the State Clearinghouse and Office of Permit Assistance. Her BA (Sociology) is from University of Oregon.

Jan Kleman, Florida Dept. of Environmental Regulation Environmental Specialist, is program administrator of Florida's HHW Collection Center Grant Program. She also assists local governments in HHW program planning, operation, publicity, and development of ordinances to comply with Florida's legislated mandates. She is a former high school science teacher.

Jim Knutzon, Senior Vice President, Scientific Certification Systems / Green Cross Certification Company, moved from a division of Shell Oil to growing lettuce and other organic vegetables in Colorado with other business and agricultural experience on the way. He has a BS in Business Administration from the University of Iowa.

John J. Kolega, Emeritus Associate Professor, University of Connecticut, Natural Resources Engineering Department, has worked and taught in agricultural engineering, soil conservation, water quality and aquifer protection for many years. He earned his PhD and MS in Engineering from Oklahoma State University.

Bill Kryger, Manager, Engineering and Planning, Solid Waste Division, Municipality of Anchorage (AK), has worked in solid and hazardous waste management for 13 years. He earned his BS in Forestry at State University of New York and a BS in Engineering at Syracuse University.

George H. Larson, Chief Executive Officer, California Integrated Waste Management Board, has been the board's CEO for 13 years; also a helicopter pilot. He has a BA in International Relations from University of South Florida.

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Larry Longanecker, Acting Deputy Director, U.S. EPA Office of Toxic Substances, Economics and Technology

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Sylvia Lowrance, Director, U.S. EPA Office of Solid Waste.

Claudia Marsales, Tricil Environmental Management (Ontario, Can.), Special Projects Sales Representative, has coordinated more than 20 permanent and special HHW collection programs and is involved locally and regionally in environmental issues.

Ralph May, Senior Research Chemist, Dupont Agricultural Products Department, has been with Dow since earning his PhD (Organic Chemistry - Indiana University) in 1967 and worked in pesticides and pollution prevention. He is a whitewater canoeist and bluegrass musician / banjo builder.

Larry McCallum, Environmental Planner, Washington State Department of Ecology, is Project Manager for local moderate risk waste planning program; he has previous experience in land use, solid waste management, and emergency management planning. He has an MS in Environmental Planning from Portland State University.

Elizabeth McCormick, Manager, HHW, Laidlaw Environmental Services, Inc. since 1988, is responsible for coordinating the company's HHW activities in the U.S. She began work in HW management in 1979 with predecessors to Laidlaw including GSX. She has a BS in Distributive Science from American University, is active with the Chemical Waste Transportation Council and is a member of the National Solid Waste Management Association Board of Directors.

Soonya W. McDavid, Manager of Technical Affairs, Chemical Specialties Manufacturers Association (CSMA), works with the scientific and technical issues relating to CSMA including regulatory and legislative matters. Her previous experience is as a data analyst for EPA under Superfund and as chemist in biotechnology. She has a BS in Chemistry from University of Arizona and an MBA from American University.

Ronald McHugh, Senior Economist, U.S. EPA Office of Policy Planning and Evaluation.

Fran McPoland, Legislative Assistant, U.S. Congressman Esteban E. Torres (D-CA), is involved in analysis of all aspects of environmental and energy policy. She has organized and conducted hearings on environmental, waste management, and recycling subjects and also has worked for the Medical Service Corp. International, National Park Foundation, Vector Biology and Control Project, and as an energy, political, and environmental consultant. She has an AA in Horticulture, a BS In Conservation of Natural Resources from University of California, Berkeley, and an MA in Public Policy - Environment and Resource Policy from George Washington University.

Emy Chan Meiorin, Senior Environmental Engineer, Association of Bay Area (CA) Governments, has responsibilities in water quality and hazardous waste management, and 18 years experience in water quality planning. She earned he BA in Environmental Studies at University of California, Berkeley.

LeeAnn Merashoff, Northeast Solvents (North Andover, MA) Manager of Field Services, manages the company's HHW program. She has worked with industrial and HW for over 6 years developing innovative management techniques, and, since 1985, has worked with over 175 communities in the northeast helping design and implement HHW collection programs. She attended VPI & SU and the University of Maryland.

Rick Miller, Hazardous Materials Specialist, San Mateo County (CA) Division of Environmental Health.

Nancy Misra, Minnesota Pollution Control Agency HW Division Special Wastes Unit Supervisor, is also project manager for Superfund sites and HW enforcement. She has an MS in soil microbiology and BS in microbiology, both from the University of Minnesota.

Susan Mooney, Acting Chief, U.S. EPA Office of Solid Waste, Source Reduction Section, is responsible for management of all municipal solid waste source reduction programs at EPA as well as development of regulations on plastic ring carriers. She has a BA in Chemistry from Franklin & Marshall College and an MSPH from University of North Carolina.

Philip Morley, President, Morley & Associates.

Gary Murchison, Toxic Substances Control Program, California Department of Health Services.

Shirley Niemeyer, Extension Specialist, Home Environment, Associate Professor, University of Nebraska, is responsible for development of educational programs statewide related to home environment and is widely published as well as involved in current research related to HHW. She has a BS in Education University of Nebraska and an MS in Housing / Architecture from Iowa State University.

Hitesh Nigam, Environmental Engineer, U.S. EPA Office of Municipal Pollution Control, manages the professional engineering aspects and implementation of national programs to assure compliance of municipal waste-

water treatment facilities; also manages HHWM awards programs. He has worked in private and public sectors on waste water treatment plant planning. He holds a BS in chemistry, an MS in Environmental Engineering.

Carolyn A. Nunley, Project Scientist, Environmental Resources Management, Inc., consults on risk assessment and risk management especially in areas involving hazardous materials. She has a BA in Chemistry from Skidmore College, and MPH from Yale University.

Judy Orttung, San Bernardino County Dept. of Environmental Health Services Supervising Environmental Health Specialist, is responsible for implementation of county HW minimization and management programs. She has published HHWM materials, has BS (University of Michigan) and MS (Stanford University) in Chemistry and an MPH from Loma Linda University.

Rubia Packard, Chief of Permit Program Development, California Department of Health Services, Toxic Substances Control Program, in 13 years with the state worked in transportation planning and economic development.

Ron Pepper, Solid Waste Supervisor, Yakima County (WA) Public Works.

Donna Portner, Pollution Control Specialist, Hazardous Waste Division, Minnesota Pollution Control Agency, helps develop multi-county regional HHWM programs. She has BS degrees in Biological Sciences and Environmental Studies from Mankato State University.

Linda Gianelli Pratt, Program Manager, Hazardous Materials Management Division, San Diego County, manages HHWM and Pollution Prevention Program. She has California State University degrees in Environmental Science (MS) and Microbiology and Chemistry (BS), also CWPCA-certified Industrial Waste Inspector.

Gina Purin, Norcal Solid Waste Systems Environmental Compliance Program Coordinator, has also been at CA Department of Health Services and Industrial Relations and was Director of Toxics at the Golden Empire Health Planning Center. She has assisted with numerous HHW collections including the first one in CA. She has a BA from the University of CA, Davis and is co-author of materials on consumer exposure to toxics.

Bill Quan, Hazardous Waste Project Manager, City and County of San Francisco, oversees development and implementation of waste reduction and management programs including HHW programs. He previously worked for the State Toxics Alternative Technology Division and has a BS in Chemistry from University of California, Berkeley and an MS from Ohio State.

Sharon Rehder, Chemical Engineer, New York State Department of Environmental Conservation, responsible for waste reduction, SQG, HHW and other programs in the Bureau of Hazardous Waste Program Development. She has a BS in Chemical Engineering from Rensselaer Polytechnic Institute.

Joseph D. Reilly, Project Engineer, HHW Program Manager, Los Angeles County (CA) Sanitation District. He earned his BS in Biology at Manhattan College, his MS in Environmental Engineering.

Larry Russell, President, Reed Corporation, specializes in the management of industrial wastes; his company's projects involve applied environmental chemistry. He holds Bs, MS and PhD in Civil/Sanitary Engineering from University of California, Berkeley.

Brenda Saldana, Waste Management Specialist, California Integrated Waste Management Board, provides HHW technical assistance and coordinates public information program. She has a BS in Biological Sciences from California State University, Chico.

Donald A. Seeberger, Consultant, until recently Hennepin County (MN) planner administering and developing alternatives for county's problem and solid waste disposal programs, recently especially involving household batteries. He earned BS (Sociology and Corrections) and MA (Urban and Regional Studies / Geography) from Mankato State University.

Carol M. Sherman, President, Grass Valley (CA) Disposal, Inc., has been actively involved for several years in the private, public, and public interest sectors in solid and hazardous waste management issues. She has a BA in education from Long Beach State University.

Michael K. Shetler, Supervising Hazardous Materials Specialist, Department of Health, Hazardous Materials Branch, Riverside, CA, is responsible for the county waste minimization and HHW programs. He earned his BA in Biology and Chemistry at California State University, San Bernardino where he also received his MA in Environmental Health Administration.

Sharon Stahl, Economist, Pollution Prevention Office, U.S. EPA, at the Agency for five years. Before moving to her present position she worked in the Office of Toxic Substances and the Office of Policy Analysis. She also worked for a year and half for the Congressional Budget Office where she did research on air toxics and hazardous

waste issues. Her BA and MA are from the University of Maryland where she is currently a candidate for a Ph.D. in Environmental Economics. She has taught economics and environmental policy at George Mason University, and economic theory, environmental economics, and labor economics at the University of Maryland.

Larry Sweetser, Norcal Solid Waste Systems Environmental Compliance Program Manager, develops programs to divert HW from landfills, one of which is the dedicated, full-time staffed HHW collection facility for the City and County of San Francisco in service since Jan. 21, 1988. He has an MA in Environmental Management from University of San Francisco.

Terry Telzrow, Manager, Standards, Product Safety (and Government Affairs), Eveready Battery Company, has worked for Eveready since 1962 and various areas of quality control, production and engineering. He has a BS in Chemical Engineering from Cleveland State (Fenn College) University.

Herbert D. Thier, Director of the Chemical Education Program for Public Understanding (CEPUP) and Associate Director of the Lawrence Hall of Science, University of California, Berkeley, is developing educational materials and strategies for school, community, and workplace which focus on developing understanding of chemicals and how they interact with people and the environment. He directed the Science Curriculum Improvement Study (SCIS) and several similar projects. He has a BA in Science and Mathematics, a masters in school administration and an EdD from New York University.

Carole Wagner Villianos, President, League of Women Voters of California.

Gerhard Vogel, Department of Technology, University of Economics, Vienna, Austria.

Barbara Walz, Manager of Environmental Affairs, National Paint & Coatings Association (NPCA), is responsible for all water quality and waste management issues under RCRA, CERCLA, SARA, and the CWA. She was previously an environmental engineer for the North Dakota Health Department, Division of Water Supply and Pollution Control. She earned her BS in Chemical Engineering at University of North Dakota.

Anna Ward, Waste Management Specialist, California Integrated Waste Management Board, co-authored the HHW grant regulations, previously a cartographer, earned her BA in Geography at California State University, Fullerton.

Kathleen Warren, HHW Program Director, HHW, Kansas Department of Health and Environment, administers a new state program granting up to 50% of the cost of HHW programs to local government. Her BA and MA are in English Literature from Indiana University and University of Maryland, respectively.

Tom Watkins, Environmental Compliance Program Specialist, Sanitary Fill Company.

Richard Wells, Vice President, ABT Associates, Inc., Cambridge, MA, directs EPA and other projects relating to market-oriented approaches to environmental management. He has degrees from Harvard (BA - Government) Fletcher School (ABD - International Relations), Sloan School, MIT (MS - Management).

Jolie Whetzel, Manager, Programs, Alberta (Canada) Special Waste Management Corporation (a public / private partnership), is responsible for: authorization of storage and treatment of hazardous wastes, programs to collect such wastes, and analysis of the Province's hazardous waste management systems. She has Environmental Science and Urban Planning & Resource Development degrees earned in Wooster, Ohio, Norwich, England and Waterloo, Ontario, and has worked in the U.S., Norway, and England from the Florida Everglades to the Canadian Arctic.

Larry Wilkinson, Northwest Enviroservice, is on-site manager of the Anchorage HHW Collection Facility and has worked with hazardous waste management designs and processes since 1972.

Jack Wolfin, Senior Planner, Snohomish County (WA) Solid Waste Management Division, manages the planning and implementation of county HHW and SQG projects and programs. He has a BS in Environmental Studies from Western Washington University.

Laura Yoshii, Deputy Director, Hazardous Waste Management Division, U.S. EPA Region Nine, with EPA since 1978, received her BA from University of California, Berkeley, MPA California State University, Hayward.

Nancy Zahedi, Program Analyst, U.S. EPA Office of Solid Waste, Municipal Solid Waste Program, provides analytical support on federal legislative issues related to municipal solid waste; also works on issues involving lead-acid and drycell batteries, and used oil collection. She previously worked with the Save the Children Foundation and with Peace Corps community development programs in Africa. She has a BA from Stanford University, and MPP from John F. Kennedy School of Government.

Appendix IV

List of Attendees

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

November 5-7, 1990 — SAN FRANCISCO, CALIFORNIA

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Appendix V

The National Listing of Household Hazardous Waste Collection Programs: 1990

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THE NATIONAL LISTING OF HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS* 1990

The data in this listing of household hazardous waste (HHW) collection programs has been collected and assembled by Dana Duxbury & Associates (DD&A) to provide basic information on HHW collection programs nationwide (including farm and conditionally exempt generator waste), and to serve as a resource for identifying program contacts. This listing includes all 1990 programs identified by DD&A. Collection program data from 1980-1987 and 1988-1989 can be ordered from DD&A.

Programs are listed by state in chronological order. Specialty programs are identified with a particular symbol (see key below). They include "paint only," "farm pesticides only," "dry cell batteries only", or oil collected at the curbside. We also specified whether a program was a permanent program. A permanent program is defined by DD&A as a program with at least monthly collections held at a fixed site or at a dedicated mobile facility. Permanent programs appear in the data base only once in each year of operation. Programs with a common sponsor and in the same community or local area are listed as a single event, even if held at multiple sites or on two or more consecutive days.

Information on costs, amount of waste collected, and number of participants is presented in the units provided by our sources. Although a single program sponsor is listed for each program, some programs have multiple sponsors. DD&A recommends contacting the sponsor for more comprehensive information about individual programs.

As no central directory or national reporting requirement exists, DD&A used various project sponsor materials, state and municipal information, personal contacts, reporting forms, and other information sources to obtain as complete and accurate data as possible. We would appreciate your assistance in keeping the listings current as well as in correcting any inaccuracies. **Please supply us with any additions or corrections.**

Specialty Program Key			
^ =	paint only	# =	farm pesticide only
@ =	special oil collection	> =	mobile collection program
BC =	household battery curbside collection	C =	curbside collection
R! =	HHW recyclables only	S =	school lab clean up
BR =	retail drop-off household battery	+ =	antifreeze only
CB =	car batteries		
* =	permanent programs (in effect at a fixed site at least once per month)		
$ =	also accepts Conditionally exempt Small Quantity Commercial Generator waste		
O =	around a number after the location, indicates number of sites participating in one collection event		
(Xdy)/(dys) =	X number of days in given time period for multi-day collection		

*The data include collection programs for HHW; farm and conditionally exempt Small Quantity Generator waste, and specialized programs such as: paint only, farm pesticide only, dry cell battery only, curbside or special used oil collection programs, etc.

[illegible]/90 [illegible] REGIL [illegible] BOUT [illegible] COLL [illegible] PROG [illegible] T ST/ [illegible] 1990

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Alabama	Huntsville CE	04/02	/90	Huntsville	Karen Scheuning	205-880-6054	Chem Waste Managemen	205-827-2670	0.00	4 ton of Batteries	0
Alabama	Dallas County S	06/	/90	Chemical Wst. Mgt.	Gordon Keene	404 951-6700	Chemical Wst. Mgt.	404 951-6700	0.00		0
Alaska	Anchorage*9		/90	Dept.Solid Wst.Servi	Bill Bryger	907-261-8223	N.W. Envir.Services	907-428-1744	925000.00		0
Alaska	Homer(2 dy)	04/27	/90	Alaska DEC/Homer	Glen Miller	907-465-2671	N.W. Envir.Services	907-428-1744	15000.00	40 drums	0
Alaska	Soldeton(4dy)	05/02	/90	Alaska DEC/Soldeton	Glen Miller	907-465-2671	N.W. Envir.Services	907-428-1744	50000.00	125 drums	0
Alaska	Kodiak(3dy)	05/10	/90	Alaska DEC/Kodiak	Glen Miller	907-465-2671	N.W.Envir.Services	907-428-1744	20000.00	60 drums	0
Alaska	Seward(2dy)	05/18	/90	Alaska DEC	Glen Miller	907-465-2671	N.W.Envir.Services	907-428-1744	10000.00	24 drums	0
Alaska	Fairbanks(3dy)	05/24	/90	Alaska DEC/North Sta	Glen Miller	907-465-2671	N.W. Envir.Services	907-428-1744	0.00		0
Alaska	Palmer(3dy)	05/31	/90	Alaska DEC/Mat-Su Bo	Glen Miller	907-465-2671	N.W. Envir.Services	907-428-1744	0.00		0
Alaska	Juneau(3dy)	06/07	/90	Alaska DEC/City of J	Glen Miller	907-465-2671	N.W.Envir.Services	907-428-1744	0.00		0
Alaska	Ketchikan(3dy)	06/14	/90	Alaska DEC/City of K	Glen Miller	907-465-2671	N.W. Envir.Services	907-428-1744	0.00		0
Arizona	Tucson*	10/06	/90	Pima County/Tucson	John Stufflebean	602-744-4013	Disposal Control	714-981-0998	300000.00		0
Arizona	Tucson*	11/01	/90	Pima Cty/City of Tuc	John Stufflebean	602-744-4013	Disposal Control	714-981-0998	0.00		0
Arizona	Phoenix	11/03	/90	City of Phoenix	Wanda Wildman	602-262-7949	Disposal Control	714-981-0998	0.00		0
California	Monterey County*		/90	Monterey Reg.W. Dist	Neil Jones	408-384-5313	I.T. Corp.	213-378-9933	52000.00	6 to 10-55gal d.year	140
California	San Francisco*		/90	City/Cty Sanitary Co	Cedar Kehoe	415-468-2442	Crosby and Overton	415-433-0330	600000.00		7829
California	Redlands*		/90	San Bern.Cty.Dept.EH	Diane Christianson	714-387-4629	Containerized Chem.	714-625-6645	19000.00		1000
California	Chula Vista*		/90	County of San Diego	Melissa Colburne	619-421-1175	Appropriate Tech.	619-421-1175	105457.00	15,953 gallons	1078
California	Santa Monica*		/90	City of Santa Monica	Brian Johnson	213-458-8228	Disposal Control	714-981-0998	0.00		0
California	Modesto CE		/90	City of Modesto	Jane Hinshaw	209-577-5493	Gilton Sol.Wst.Mgt.	209-527-3781	0.00	1300 gallons monthly	0
California	Barstow*		/90	San Bernardino DHS	Judy Orttung	714-387-4629	Containerized Chem.	714-625-6645	0.00		0
California	Rancho Cucamonga*		/90	San Bernardino DHS	Judy Orttung	714-387-4629	Containerized Chem.	714-625-6645	0.00		0
California	Victorville*		/90	San Bernardino DHS	Judy Orttung	714-387-4629	Containerized Chem.	714-625-6645	0.00		0
California	Milpitas CE		/90	City of Milpitas	Robert Webster	408-942-2386			0.00		0
California	Sunnyvale CE		/90	Ass. Bay Area Govt.	Ray Chan Majoria	415-464-7941			0.00		0
California	Coronado*	01/12	/90	County of San Diego	Pam Jackson	619-338-2175	Appropriate Tech.	619-421-1175	20500.00	3000gallons/yr.proje	375
California	Palo Alto	01/20	/90	Santa Clara County	Janet Foreman	415-329-2495	Safety Specialists	408-988-1111	0.00	536 gallons Paint	462
California	Sacramento	01/20	/90	Sac.County/Env.Hgt.D	Dan Hee	916-386-6160	AEBC	916-364-8872	0.00		0
California	Southeast San Diego	01/20	/90	County of San Diego/	Phyllis Chalmers	619-338-2368	Appropriate Tech.	619-421-1175	0.00		0
California	San Mateo County	01/27	/90	San Mateo County	Rick Miller	415-363-4306	Safety Specialists	408-988-1111	0.00		0
California	Alameda County	02/	/90	County	Melanie Killian	415-271-4320	Chemical Wst.Manag.	415-651-2964	0.00		0
California	San Mateo County	02/22	/90	San Mateo Cty.Hlth.D	Rick Miller	415-363-4306	Safety Specialists	408-988-1111	0.00		0
California	Riverside County*)	02/24	/90	Riverside County DEH	Mike Sheller	714-358-5055	Disposal Control	714-981-0998	100000.00	170 drums	579
California	Sacramento	02/24	/90	Sac.County Env.Hgt.D	Dan Hee	916-386-6160	AEBC	916-364-8872	0.00		0
California	Old Town	02/24	/90	County of San Diego	Phyllis Chalmers	619-338-2368	Appropriate Tech.	619-421-1175	0.00		0
California	San Mateo County	02/24	/90	San Mateo Cty.Hlth.D	Rick Miller	415-363-4306	Safety Specialists	408-988-1111	0.00		0
California	San Bernardino Count	02/24	/90	San Bernardino Count	Judy Orttung	714-387-4646			4097.00	240 gal oil,140 gal	129
California	Mission Viejo	02/25	/90	County of Orange	Larry Fink		Disposal Control Svs	714-981-0998	0.00		1500
California	San Mateo County	03/06	/90	San Mateo Cty.Hlth.D	Rick Miller	415-363-4306	Safetey Specialists	408-988-1111	0.00		0
California	Campbell/Los Gatos	03/10	/90	Santa Clara County	Todd Argow	408 867-3432	Safety Specialists	408 988-1111	150000.00	1644 gallons paint	1884
California	Glendale-Fire Dept.L	03/10	/90	City of Glendale	Judy Frantz	818-956-7759	Env. Dynamics	213-838-5181	0.00		0
California	San Mateo County	03/10	/90	San Mateo Cty.Hlth.D	Rick Miller	415-363-4306	Safety Specialists	408-988-1111	0.00		0
California	Sacramento	03/17	/90	Sac.County Env.Hgt.D	Dan Hee	916-386-6160	AEBC	916-364-8872	0.00		0
California	South San Diego	03/17	/90	County of San Diego/	Phyllis Chalmers	619-338-2368	Appropriate Tech.	619-421-1175	0.00		0
California	Lucerne Valley	03/17	/90	San Bernardino Count	Judy Ortunag	714-387-4646			1836.00	135 gal oil,30 gal f	21
California	Petaluma	03/24	/90	City Fire Dept.	Clyde Thomas	707-778-4389	Chem.Waste Mgt.	415-651-2964	21750.00	46 drums	0
California	Mira Mesa	03/31	/90	County of San Diego/	Phyllis Chalmers	619-338-2368	Appropriate Tech.	619-421-1175	0.00		0
California	29 Palms	03/31	/90	San Bernardino Count	Judy Orttung	714-387-4646			3144.75	135 gal oil,80 gal f	84
California	Yucca Valley	03/31	/90	San Bernardino Count	Judy Orttung	714-387-4646			3854.75	300 gal oil,80 gal f	141
California	Los Altos,Mtnvw,Cupe	04/01	/90	Cities	Daphne Seigert	415-948-1491	1990-Bay Area Env.	415-223-8801	50000.00	400g oil/740g pt/113	1045
California	San Mateo County	04/05	/90	San Mateo Cty.Hlth.D	Rick Miller	415-363-4306	Safety Specialists	408-988-1111	0.00		0
California	Burbank	04/07	/90	City of Burbank	Stan Nelson	818-953-8771	Safety Specialists	408-988-1111	141000.00	1050 gallons Paint	1050
California	El Cajon	04/07	/90	County of San Diego/	Phyllis Chalmers	619-338-2368	Appropriate Tech.	619-421-1175	0.00		0
California	Healdsburg	04/07	/90	City Fire Dept.	Hallie Harrison	415-651-2964	Chemical Wst.Manag.	415-651-2964	19558.00	33 drums	0
California	Claremont Pub.Serv.T	04/07	/90	City of Claremont	Judy Frantz	818-955-7759	Appropriate Tech.	619-421-1175	0.00		0
California	San Mateo County	04/07	/90	San Mateo Cty.Hlth.D	Rick Miller	415-363-4306	Safety Specialists	408-988-1111	0.00		0
California	Rancho Cucamonga*	04/14	/90	San Bernardino Count	Judy Orttung	714-387-4646			17078.30	2160 gal oil,180 gal	618
California	Milpitas/Santa Clara	04/18	/90	Santa Clara County	Robert Webster	408/942-2386	Safety Specialists	408-988-1111	0.00		0
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STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
California	Los Altos Hls/Mtn Vw	04/21	/90	Santa Clara County	Daphne Siegert	415/948-1491	Safety Specialists	408-988-1111	0.00		0
California	Palo Alto	04/21	/90	Santa Clara County	Ted Janes	415/496-6928	Safety Specialists	408-988-1111	0.00		0
California	Pittsburg(2dy) $	04/21	/90	Dow Chemical Co.	Julie Hubbard	415 432-6304	Pleasant Hill Disp.	415 685-4711	1500.00	2446 lbs.	40
California	Los Angeles *	04/21	/90	UniCal	Fazi Hofidi	213-485-9823	USPCI	406-324-4200	0.00	10500gl-oil,306batts	1455
California	Sacramento	04/21	/90	Sac.County Env.Mgt.D	Dan Noe	916-386-6160	AERC	916-364-9872	0.00		0
California	Kirkland	04/21	/90	City	Hallie Harrison	415-651-2964	Chemical Wst. Manag.	415-651-2964	0.00		0
California	City of Santa Clara	04/21	/90	City	Bill Alexander	408-984-3080	Safety Specialists	408-988-1111	0.00	142 drums	704
California	City of Milpitas	04/21	/90	County of Santa Clar	Bob Webster	408-942-2382	Safety Specialists	408-988-1111	0.00	71 drums	425
California	Wilmington-UNOCAL	04/21	/90	City of LA/Bur.Sanit	Judy Frantz	916-986-7759	US Poll. Control	406-324-4200	0.00		0
California	Chino	04/21	/90	San Bernardino Count	Judy Ortteng	714-387-4646			12536.47	1735 gal oil,260 gal	287
California	Montclair	04/21	/90	San Bernardino Count	Judy Ortteng	714-387-4646			10293.46	715 gal oil,33 dr pa	183
California	Fontana	04/22	/90	San Bernardino Count	Judy Ortteng	714-387-4646			3835.00	330 gal oil,45 gal 9	75
California	Santa Barbara $	04/26	/90	County of Santa Barb	Karen Feeney	805-963-0583	HSE Environmental	805-987-0217	175530.00	262 drums,33gals oil	720
California	Pasadena	04/26	/90	Cty.of Los Angeles	Joseph Reilly	213-699-7411	Safety Specialists	408-988-1111	0.00	949 drums	4200
California	Santa Rosa(2dy)	04/26	/90	City Fire Dept.	Eileen Kertas	707-576-5384	Chemical Wst.Mgt.	415-651-2964	66667.20	97 drums	0
California	Davis	04/26	/90	County of Yolo	Norman Ploss	916-666-8775	Safety Specialists	408-988-1111	0.00	57 drums	395
California	Woodland	04/26	/90	County of Yolo	Norman Ploss	916-666-8775	Safety Specialists	408-988-1111	0.00	35 drums	400
California	City of Palo Alto	04/26	/90	City	Janet Foreman	415-329-2495	Safety Specialists	408-988-1111	0.00	140 drums	641
California	Grass Valley	04/26	/90	Nevada County	Woody Nelsen	916-265-1411	Safety Specialists	408-988-1111	0.00	196 drums	0
California	City of El Segundo	04/26	/90	City	Bill Cameron	213-322-3769	Safety Specialists	408-988-1111	0.00	47 drums	0
California	Crestline	04/26	/90	San Bernardino Count	Judy Ortteng	714-387-4646			5772.90	210 gal oil,125 gal	109
California	Highland	04/26	/90	San Bernardino Coun*	Judy Ortteng	714-387-4646			11110.32	675 gal oil,11 dr240	342
California	San Mateo County	05/03	/90	County Hlth.Dept.	[illegible]k Miller	415-363-4305	Safety Specialists	408-988-1111	0.00		0
California	Pleasanton,Livermore	05/05	/90	City	Rick Mueller	415-484-8114	Chemical Wst.Manage.	415-651-2964	0.00		0
California	Long Beach	05/05	/90	Sanitation Districts	Joe Re[illegible]	213-699-7411	Safety Specialists	408-988-1111	0.00	504 drums	0
California	San Mateo County	05/05	/90	County Health Dept.	Rick Miller	415-363-4305	Safety Specialists	408-988-1111	0.00		0
California	Upland	05/06	/90	San Bernardino Count	Judy Ortteng	714-387-4646			12408.27	910 gal oil,32dr,200	276
California	Simi Valley Civic Ce	05/12	/90	City of Simi Valley	Judy Frantz	916-855-7759	Laidlaw	800-845-1019	0.00		0
California	San Mateo County	05/17	/90	County Health Dept.	Rick Miller	415-363-4305	Safety Specialists	408-988-1111	0.00		0
California	Morgan Hill	05/19	/90	Santa Clara County	SharonKohlmannslehar	408/779-7231	Safety Specialists	408-988-1111	0.00		0
California	Sunnyvale	05/19	/90	Santa Clara County	Rich Garney	408/730-7227	Safety Specialists	408-988-1111	0.00	172 drums	0
California	Santa Ynez Valley $	05/19	/90	Santa Barbara County	Karen Feeney	805-963-0583	HSE Environmental	805-987-0217	48850.00	53dms,700glsoil,275p	253
California	Sacramento	05/19	/90	Sac.County Env.Mgt.D	Dan Noe	916-386-6160	AERC	916-364-9872	0.00		0
California	Escondido	05/19	/90	County of San Diego/	Phyllis Chalmers	619-338-2368	Appropriate Tech.	619-421-1175	0.00		0
California	Sonoma	05/19	/90	City Fire Dept.	Hallie Harrison	415-651-2964	Chem.Waste Mgt.	415-651-2964	22200.00	61 drums	0
California	Whittier	05/19	/90	Sanitation Districts	Richard Garney	408-730-7277	Safety Specialists	408-988-1111	0.00	172 drums	0
California	Inglewood Fire Train	05/19	/90	City of Inglewood	Judy Frantz	916-855-7759	Western Waste Ind.		0.00		0
California	San Mateo County	05/19	/90	County Health Dept.	Rick Miller	415-363-4305	Safety Specialists	408-988-1111	0.00		0
California	Apple Valley	05/19	/90	San Bernardino Count	Judy Ortteng	714-387-4646			3457.75	90 gal oil,7.5dr,15g	40
California	Modesto/Patterson/Ca	06/01	/90	Stanislaus County	Jim Simpson	209-525-4150			1242900.00	oil,hhw	0
California	Los Angeles	06/02	/90	City of Los Angeles	Fazi Hofidi	213-485-9823	Safety Specialists	408-988-1111	0.00	528 drums	3000
California	Hohsert Park	06/02	/90	City	Hallie Harrison	415-651-2964	Chem.Waste Mgt.	415-651-2964	11765.00	19 drums	0
California	Novato	06/02	/90	Marin County	Sharon Hayes	415-499-6269	Safety Specialists	408-988-1111	0.00		0
California	Reseda	06/02	/90	City of LA/Bur.Sanit	Judy Frantz	916-855-7759	Safety Specialists	408-988-1111	0.00		0
California	San Mateo County	06/02	/90	County Health Dept.	Rick Miller	415-363-4305	Safety Specialists	408-988-1111	0.00		0
California	Lompoc Corporate Yar	06/04	/90	Santa Barbara County	Judy Frantz	916-855-7759	HSE Environmental	805-987-0217	0.00		0
California	Lompoc $	06/09	/90	Santa Barbara County	Karen Feeney	805-963-0583	HSE Environmental	805-987-0217	73226.00	98drm,2880glsoil,605	720
California	Nicasio	06/09	/90	Marin County	Sharon Hayes	415-499-6269	Safety Specialists	408-988-1111	0.00		225
California	Contra Costa County/	06/09	/90	All 18 Cities in Cou	Robin Bedell	415-646-2288			0.00	16000 gls6, 3000gls*	4000
California	Big Bear	06/09	/90	San Bernardino Count	Judy Ortteng	714-387-4646			7289.81	715gal oil,19dr,140g	244
California	San Mateo County	06/14	/90	County Health Dept.	Rick Miller	415-363-4305	Safety Specialists	408-988-1111	0.00		0
California	West Clairemont	06/16	/90	County of San Diego/	Phyllis Chalmers	619-338-2368	Appropriate Tech.	619-421-1175	0.00		0
California	San Mateo County	06/16	/90	County Health Dept.	Rick Miller	415-363-4305	Safety Specialists	408-988-1111	0.00		0
California	Ponona	06/19	/90	Los Angeles County	Joseph Reilly	213-699-7411	Safety Specialists	408-988-1111	0.00		0
California	Union City	06/23	/90	Union City	Jackie Bretschneider	415-790-7254	Chemical Waste Mgt.	415-651-2964	400000.00		180
California	City of Oxnard	06/23	/90	Ventura Cty. San.Dis	Judy Frantz	916-855-7759	HSE Environmental	805-987-0217	0.00		0
California	Morgan Hill/Gilroy	06/23	/90	City of Morgan Hill	Sh'ron Kohlmannslehar	408-779-7351	Safety Specialists	408-988-1111	0.00		0
California	Fremont	06/30	/90	Fremont	Jackie Bretschneider	415-790-7254	Chemical Waste Mgt.	415-651-2964	0.00		0
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California	Santa Maria 9	06/30	/90	Santa Barbara County	Judy Frantz	916-855-7759	HSE Environmental	805-987-0217	0.00			0
California	Cupertino/Los Altos	07/14	/90	Santa Clara County	Steve Sano	408/252-4505	Safety Specialists	408-988-1111	0.00			0
California	Ukiah	07/14	/90	County of Mendocino	Hallie Harrison	415-651-2964	Chem.Waste Mgt.	415-651-2964	20766.00	68 drums		0
California	Irvine	07/21	/90	City	Hallie Harrison	415-651-2964	Chemical Wst. Mgt.	415-651-2964	0.00			0
California	Kirkland	07/28	/90	City	Hallie Harrison	415-651-2964	Chemical Wst.Mgt.	415-651-2964	0.00			0
California	City of Palo Alto	07/28	/90	City	Janet Foreman	415-329-2495	Safety Specialists	408-988-1111	0.00			0
California	Sacramento	07/28	/90	Sacramento County	Judy Frantz	916-855-7759	AEM	714-826-6320	0.00			0
California	Santa Rosa(2dy)	08/11	/90	City	Hallie Harrison	415-651-2964	Chem.Waste Mgt.	415-651-2964	0.00			0
California	Truckee	08/11	/90	County of Nevada	Woody Heisey	916-265-1555	Safety Specialists	408-988-1111	0.00			0
California	Visalia *	08/20	/90	Tulare Co. Health De	Larry Dvoskin	209-733-6441	Chemical Waste Magnt	800-222-2964	300000.00	drums NHW only		0
California	Sacramento	08/25	/90	Sacramento County/DH	Judy Frantz	916-855-7759	AEM	714-826-6320	0.00			0
California	San Mateo County(6dy	09/06	/90	San Mateo Cty.Health	Rick Miller	415-363-4305	Safety Specialists	408-988-1111	0.00			0
California	San Rafael	09/08	/90	Marin County	Sharon Eaves	415-499-6269	Safety Specialists	800-421-6710	0.00			0
California	Lemon Grove	09/08	/90	San Diego County DPW	Phyllis Chalmers	619-338-2368	Appropriate Tech	619-421-1175	0.00			0
California	San Diego City/Count	09/08	/90	San Diego	Pam Jackson	619-338-2287	Appropriate Tech.	619-421-1175	0.00			0
California	Nevada County	09/08	/90	Nevada County	Woody Heisy	916-265-1555	Disposal Control	714-981-0999	0.00			0
California	Kirkland	09/15	/90	City	Hallie Harrison	415-651-2964	Chemical Waste Mgt.	415-651-2964	0.00			0
California	Mill Valley	09/15	/90	Marin County	Sharon Eaves	415-499-6269	Safety Specialists	800-421-6710	0.00			0
California	Davis	09/15	/90	Yolo County	916-666-8775		Safety Specialists	800-421-6710	0.00			0
California	Palo Alto	09/15	/90	Santa Clara County	Chad Centola	415-496-6986	Safety Specialists	800-421-6710	0.00			0
California	San Bernardino Count	09/20	/90	San Bernardino Count	Diane Christensen	714-387-4629	Chemical Disposal	714-625-6645	0.00			0
California	City of Hayward	09/22	/90	City of Hayward	Steven Faelz	415-784-8690	Safety Specialists	408-988-1111	0.00			0
California	County of San Diego	09/22	/90	San Diego Water Util	Linda Gianelli Pratt	619-338-2215	Appropriate Tech	619-421-1175	0.00			0
California	San Bernardino Count	09/27	/90	San Bernardino Count	Diane Christensen	714-387-4629	Chemical Disposal	714-625-6645	0.00			0
California	Davis	09/29	/90	County of Yolo	Norman Floss	916-666-8775	Safety Specialists	800-421-6710	0.00			0
California	West Sacramento	09/29	/90	County of Yolo	Norman Floss	916-666-8775	Safety Specialists	800-421-6710	0.00			0
California	City of Santa Clara	09/29	/90	County	Bill Alexander	408-984-3080	Safety Specialists	408-988-1111	0.00			0
California	Sacramento City&Coun	09/29	/90	Sacramento County	Wellington Yee	916-386-6161	AEM	714-826-6320	0.00			0
California	Santa Clara	09/29	/90	City of Santa Clara	Pamela Heggins	408-441-1195	Safety Specialists	800-421-6710	0.00			0
California	Yolo County	09/29	/90	Yolo County	Eric Miller	916-386-6161	Safety Specialist	800-421-6710	0.00			0
California	South Lake Tahoe	09/30	/90	El Dorado County	Rebecca Post	916-621-5307	Safety Specialists	800-421-6710	0.00			0
California	El Dorado County	09/30	/90	El Dorado County	Rebecca Post	916-621-5307	Safety Specialists	800-421-6710	0.00			0
California	Kern County	10/	/90	Public Works Dept.	Lynn Beurman	805-861-2461			0.00			0
California	Santa Cruz County*	10/00	/90	Santa Cruz Cty.Pub.W	Patrick Mathews	408-425-2133	Safety Specialists	408-988-1111	127000.00			0
California	Santa Rosa	10/06	/90	City	Hallie Harrison	415-651-2964	Chem.Waste Mgt.	415-651-2964	0.00			0
California	Placerville	10/06	/90	El Dorado County	Rebecca Post	916-621-5307	Safety Specialists	800-421-6710	0.00			0
California	City of Santa Rosa	10/06	/90	City Fire Department	Eileen Kortas	707-576-5384	Chemical Waste Mgmt.	415-651-2964	0.00			0
California	City of Salinas	10/06	/90	City of Salinas	Sy Appel		HSE Environmental	805-987-0217	0.00			0
California	El Dorado County	10/06	/90	El Dorado County	Rebecca Post	916-621-5307	Safety Specialists	800-421-6710	0.00			0
California	Palo Alto	10/07	/90	Santa Clara County	Daphne Siegert	415-948-6828	Safety Specialists	408-988-1111	0.00			0
California	City of Mountain Vie	10/13	/90	City of Mountain Vie	Gary Leinweber		Safety Specialists	800-421-6710	0.00			0
California	City of Palo Alto	10/13	/90	Santa Clara County	Chad Centola		Safety Specialists	800-421-6710	0.00			0
California	Newark (tri-city)	10/13	/90	Fremont,Union,Newark	Kara Dinhoffer		Chemical Waste Mgmt.	415-651-2964	0.00			0
California	San Marcos	10/13	/90	San Diego County DPW	Phyllis Chalmers	619-338-2368	Appropriate Tech	619-421-1175	0.00			0
California	Tri-Cities	10/13	/90	City	Hallie Harrison	415-651-2964	Chemical Waste Mgmt.	415-651-2964	0.00			0
California	County of San Diego	10/13	/90	County of San Diego	Linda Gianelli Pratt	619-338-2215	Appropriate Tech.	619-421-1175	0.00			0
California	Bakersfield(4 locati	10/13	/90	Kern County DPW	Greg Sanders	916-855-7759	Safety Specialists	800-421-6710	0.00			0
California	Kern County (4 sites	10/13	/90	Kern County	Chris Burger		Safety Specialists	800-421-6710	0.00			0
California	San Jose	10/13	/90	Santa Clara County	Kenneth Toy		Safety Specialists	800-421-6710	0.00			0
California	San Mateo County(6dy	10/18	/90	County Health Dept.	Rick Miller	415-363-4305	Safety Specialists	800-421-6710	0.00			0
California	City of Petaluma	10/20	/90	City of Petaluma	Clyde Thomas	707-787-4389	Chem.Waste Mgt.	415-651-2964	0.00			0
California	Sacramento City&Coun	10/20	/90	Sacramento County/DH	Dan Hee	916-386-6160	AEM	714-826-6320	0.00			0
California	Sunnyvale	10/20	/90	Santa Clara County	Richard Gurney	408-730-7277	Safety Specialists	800-421-6710	0.00			0
California	Kern County (3 sites	10/20	/90	Kern County DPW	Chris Burger		Safety Specialists	800-421-6710	0.00			0
California	Los Angeles County	10/20	/90	Los Angeles County	Joseph Reilly	213-699-7411	Appropriate Tech	213-699-7411	0.00			5
California	Santa Barbara County	10/20	/90	Santa Barbara County	Sharyn Martin		Chemical Waste Mgmt.	415-651-2964	0.00			2
California	San Bernardino Count	10/20	/90	San Bernardino Count	Judy Ortlung	714-387-4629			0.00			0
California	San Bernardino*	10/20	/90	S.Bern.Cty.DHS	Judy Ortlung	714-387-4629	Containerized Chem.	714-625-6645	0.00			0
California	Riverside County*	10/20	/90	Riverside County	Mike Sheller	714-358-5055	Disposal Control	714-983-0212	0.00			0

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California	San Mateo(7dy)	10/26	/90	San Mateo Cty.Health	Rick Hiller	415-363-4305	Safety Specialists	408-988-1111	0.00			0
California	Baldwin Park	10/27	/90	City	Hallie Harrison	415-651-2964	Chemical Waste Mgt.	415-651-2964	0.00			0
California	Kern County (1 site)	10/27	/90	Kern County DPW	Chris Berger		Safety Specialists	800-421-6710	0.00			0
California	City of Beverly Hill	10/27	/90	City of Beverly Hill	Arthur Cassling		Disposal Control	714-981-0998	0.00			0
California	San Bernardino Count	10/27	/90	San Bernardino Count	Judy Ortteng	714-387-4629			0.00			0
California	Kirkland	11/03	/90	City	Hallie Harrison	415-651-2964	Chemical Waste Mgt.	415-651-2964	0.00			0
California	Palo Alto	11/03	/90	City of Palo Alto	Daphne Siegert	415-948-6928	Safety Specialists	800-988-1111	0.00			0
California	Irvine	11/02	/90	City	Hallie Harrison	415-651-2964	Chemical Waste Mgmt.	415-651-2964	0.00			0
California	Ventura Regional	11/03	/90	Ventura Regional SD	Kelly R. White	805-658-4614	HSE Environmental	805-987-0217	0.00			0
California	City of Palo Alto	11/13	/90	City of Palo Alto	Chad Centola		Safety Specialists	800-421-6710	0.00			0
California	Sacramento City&Coun	11/17	/90	Sacramento County/DH	Dan Hoe	916-386-6160	AEH	714-826-6320	0.00			0
California	San Diego County	11/17	/90	San Diego Water Util	Pam Jackson	619-338-2207	Appropriate Tech	619-338-2368	0.00			0
California	Mojave(airport)	11/17	/90	City	Greg Sanders	805-861-2481	Chemical Waste Mgmt.	415-651-2964	0.00			0
California	San Bernardino Count	11/27	/90	San Bern. Cty. DHS	Judy Ortteng	714-387-4629	Containerized Chem.	714-625-6645	0.00			0
California	Yuba/Sutter County	12/	/90	Sutter County Health	Roger Davies	916-741-7219			0.00			0
California	San Diego County	12/01	/90	San Diego County DPW	Pam Jackson	619-338-2207	Appropriate Tech	619-421-1175	0.00			0
California	Sacramento City&Coun	12/15	/90	Sacramento County/DH	Dan Hoe	916-386-6160	AEH	714-826-6320	0.00			0
California	Kern County	Sept.	/90	Local Spawn Bureau/P	Lynn Suerman	805-861-2481			0.00			0
California	Saratoga	TBA	/90	Santa Clara County	Co Haz Waste Pro	408/299-2424	Safety Specialists	408-988-1111	0.00			0
California	Santa Clara	TBA	/90	Santa Clara County	Bill Alexander	408-984-3080	Safety Specialists	408-988-1111	0.00			0
California	Ft. Collins*†		/90	Larimer County	Janelle Henderson	303-221-7712	Rollins Env.Services	713-930-2329	0.00			0
Colorado	Estes Park*	04/21	/90	Larimer County	Janelle Henderson	303-221-7712	Rollins Env.Services	713-930-2329	0.00			0
Colorado	Golden/JeffcoCo(2dy	05/19	/90	Jefferson County	Rich Fatuzzo	303/278-5845	Laidlaw Env. Servic.	800-845-1019	58000.00	30900 lbs. 110 drums	1212	
Connecticut	East Windsor	03/31	/90	Town of East Windsor	Paul Franson	203-566-4869	Radiac	718 983-2233	0.00	50 drums	125	
Connecticut	Rocky Hill	04/21	/90	Town of Rocky Hill	Paul Franson	203 566-4869	AETC	508-460-9860	19796.65		126	
Connecticut	Ambros,Andover-4 tow	04/21	/90	All 4 towns	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	0.00		200	
Connecticut	New Britain, Berlin	04/23	/90	Both Towns	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	0.00		496	
Connecticut	Manchester	04/23	/90	Town of Manchester	Paul Franson	203 566-4869	Clean Harbors	508-655-8863	25000.00		300	
Connecticut	Stonington	04/23	/90	Town of Stonington	Paul Franson	203 566-4869	Clean Harbors	508-655-8863	19000.00		200	
Connecticut	Bethel,Newton, 4 tow	05/05	/90	All 4 towns	Paul Franson	203 566-4869	Clean Harbors	508-655-8863	0.00		427	
Connecticut	Plainville	05/05	/90	Town of Plainville	Paul Franson	203 566-4869	Triumvirate Env.	617-328-9232	0.00		147	
Connecticut	Wilton	05/05	/90	Conservation Commiss	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	50000.00	117 drums,55gallons	533	
Connecticut	Windsor,Bloomfld,3to	05/05	/90	All 3 towns	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	0.00		350	
Connecticut	Groton	05/12	/90	Town of Groton	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	0.00		475	
Connecticut	Norwalk	05/19	/90	Town of Norwalk	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	0.00		0	
Connecticut	New Haven* (weekly)	05/26	/90	South.CT.Reg.Water A	Suzanna Benson	203-624-6671	Laidlaw Northeast	508-683-1002	0.00		1200	
Connecticut	Wethersfield	06/02	/90	Town of Wethersfield	Paul Franson	203 566-4869	Radiac	718-983-2233	0.00		0	
Connecticut	Waterford,N.London	06/02	/90	Both Towns	Paul Franson	203-793-0221	Laidlaw Northeast	508-683-1002	0.00		0	
Connecticut	Plainville	06/05	/90	Town of Plainville	Robert Flan	203-848-3030	Triumvirate Environ.	617-328-9282	13855.00	32-55 gallon drums	0	
Connecticut	Uncasville	06/06	/90	Montville	Frank Kaczmarek		Laidlaw Northeast	508-683-1002	0.00		192	
Connecticut	Waterford	06/09	/90	Waterford	Ed Steward		Laidlaw Northeast	508-683-1002	0.00		560	
Connecticut	Montville	06/16	/90	Town of Montville	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	0.00		0	
Connecticut	Glastonbury	06/16	/90	Glastonbury	Paul Franson	203-566-4869	Laidlaw Northeast	508-683-1002	0.00		420	
Connecticut	Woodbry,Southbry,4to	06/23	/90	All 4 towns	Paul Franson	203 566-4869	Laidlaw Northeast	508-683-1002	0.00		0	
Connecticut	Ellington	06/23	/90	Town of Ellington	Paul Franson	203-566-4869	Tri-S	203-875-2110	0.00		0	
Connecticut	New Haven	07/07	/90	So. CT Reg. Water Au	Suzanna Benson	203-624-6671	Laidlaw	800-845-1019	0.00		0	
Connecticut	Norwich	09/15	/90	City of Norwich	Carl Dobratz	203-886-2381	Triumvirate Environ.	617-328-9282	32060.00	28-55gal28-30gal6-5g	0	
Connecticut	New Haven	09/15	/90	So. CT. Reg. Water A	Suzanna Benson	203-624-6671	Laidlaw	508-683-1002	0.00		0	
Connecticut	Southington	09/15	/90	Southington	Dr. Arthur Blumer	203-276-6275	Laidlaw	508-683-1002	0.00		0	
Connecticut	Avon/Canton/Symsbury	09/22	/90	Town of Avon	Hudson Birden	203-677-2634	Laidlaw	508-683-1002	0.00		0	
Connecticut	New Haven	09/22	/90	So. CT. Reg. Water A	Suzanna Benson	203-624-6671	Laidlaw	508-683-1002	0.00		0	
Connecticut	Monroe/Trumbull/East	09/22	/90	Towns	Paul Franson	203-566-4869	Clean Harbors	508-655-8863	0.00		0	
Connecticut	Norwich	09/25	/90	Norwich	Carlo Dobratz	203-886-2381	Triumvirate Environ.	617-328-9232	0.00		0	
Connecticut	New Haven	09/29	/90	So. Ct. Reg. Water A	Suzanna Benson	203-624 6671	Laidlaw	508-683-1002	0.00		0	
Connecticut	Ledyard/Preston	09/29	/90	Ledyard Conserv. Com	Gordon Thomson	203-433-9902	Triumvirate Environ.	617-328-9232	24165.00	46-55gal31-30gal 6-5	0	
Connecticut	Stanford	10/	/90	Stanford	Paul Franson	203-566-4869			0.00		0	
Connecticut	Newington	10/	/90	Newington	Bob Cosgrove	203-666-4661			0.00		0	
Connecticut	Farmington	10/	/90	Town of Farmington	Elizabeth S Dolphin	203-673-9200			0.00		0	
Connecticut	New Haven	10/06	/90	So. Ct. Reg. Water A	Suzanna Benson	203-624-6671	Laidlaw	203-683-1002	0.00		0	

STATE	LOCATION	DATE	SPONS...	CONTA...	CPHC...	...I	...E	WAS	PA...
Connecticut	Enfield	10/06 /90	Town of Enfield	Geoffrey McAlmond	203-745-0371	Laidlaw	508-683-1002	0.00	0
Connecticut	East Hartford	10/06 /90	City	Richard Toci	203-289-2781	Radiac	718-963-2233	0.00	0
Connecticut	Fairhaven	10/13 /90	Fairhaven	Paul Franson	203-566-4869	Clean Harbors	508-655-8863	0.00	0
Connecticut	Windsor Locks	10/13 /90	Windsor Locks	Michael Wrabel	203-627-1405	Laidlaw	508-683-1002	0.00	0
Connecticut	Fairfield	10/20 /90	Town of Fairfield	Lt. William Kesler	203-254-4720	Clean Harbors	508-655-8863	0.00	0
Connecticut	Meriden	10/20 /90	Meriden	Paul Franson	203-566-4869	Laidlaw	508-683-1002	0.00	0
Connecticut	Torrington(+ 3 towns	10/20 /90	4 towns	Richard Lynn	203-491-9884	Laidlaw	508-683-1002	0.00	0
Connecticut	Bristol	10/27 /90	Town of Bristol	Allen Conrod	203-584-7607	Laidlaw	203-566-5125	0.00	0
Connecticut	Greenwich	11/03 /90	Town of Greenwich	Paul Franson	203-566-4869	Radiac	718-963-2233	0.00	0
Connecticut	Newington	11/03 /90	Town of Newington	Bob Cosgerve	203-666-4861	Clean Harbors	508-655-8863	0.00	0
Connecticut	Bolton	11/03 /90	Town of Bolton	Helen Kemp	203849-8066	Clean Harbors	508-655-8863	0.00	0
Connecticut	Suffield	11/17 /90	Town of Suffield	Paul Franson	203-566-4869	Clean Harbors	508-655-8863	0.00	0
Connecticut	Danbury	11/20 /90	Town of Danbury	Paul Franson	203-566-4869	Radiac	718-963-2233	0.00	0
Delaware	Bloomington-Merc.Rec	06/02 /90	Hercules Resource Ct	Terri Winder	302-594-9000	AETC	201-347-7111	0.00	0
Florida	West Palm Bch* (2sit	/90	Palm Beach County	Dave Gregery	407-687-1100			0.00	0
Florida	Cantonment	01/06 /90	Escambia County	Sgt. Lee Nelson	904/968-6628			0.00	0
Florida	Pinellas Co. (2dy)	01/09 /90	FL DER Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	79,400lbs. 650
Florida	Pinellas County(2dy)	01/13 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	79,400lbs. 650
Florida	Pinellas County(2dy)	01/20 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	79,400lbs. 650
Florida	Manatee Co. (2)(1dy)	01/23 /90	FL DER Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	0
Florida	Punta Gorda	01/26 /90	Charlotte County	Jim Thompson	813 639-1349			0.00	0
Florida	Bradenton, Manatee	01/27 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	0
Florida	Polk County(2dy)	02/01 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	57,567lbs. 459
Florida	Polk County(2dy)	02/06 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	73,933lbs. 186
Florida	Hardee County(2dy)	02/09 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	29,821lbs. 134
Florida	DeSoto County(2dy)	02/17 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	22,691lbs. 175
Florida	Vero Beach	02/21 /90	Indian River County	Ronald Brooks	407-567-8000	Laidlaw	800-345-1019	0.00	0
Florida	Highlands County(2dy	02/23 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	56,925lbs. 692
Florida	Brevard County	03/ /90		Deborah Luger	406/453-8522			0.00	0
Florida	Lake County	03/02 /90	Lake County	Susan Larson	904-343-9738	Laidlaw	800-345-1019	0.00	0
Florida	Orlando (2dy)	03/03 /90	Orange County	Nick Sassic	407/244-7400			0.00	0
Florida	Orlando	03/03 /90	Orange County	Nick Sassic	407 244-7400			0.00	0
Florida	Okeechobee County(2d	03/10 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	12,299lbs. 91
Florida	Citrus County(2dy)	03/16 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	32,404lbs. 249
Florida	Hernando County(2dy)	03/24 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	41,935lbs. 581
Florida	Melbourne	03/27 /90	Brevard County	Deborah Luger	407-453-8522	Laidlaw	800-345-1019	0.00	0
Florida	Coco Beach	03/29 /90	Brevard County	Deborah Luger	407-453-8522	Laidlaw	800-345-1019	0.00	0
Florida	Titusville	03/31 /90	Brevard County	Deborah Luger	407-453-8522	Laidlaw	800-345-1019	0.00	0
Florida	Daytona Beach	04/06 /90	Volusia County Env.C	Lindalee Anderson	904-254-4612	Laidlaw	800-345-1019	0.00	0
Florida	Orlando	04/07 /90	Orange County	Nick Sassic	407-244-7400	Laidlaw	800-345-1019	0.00	0
Florida	Central Fl.Fairgreen	04/07 /90	Orange County	Nick Sassic	407-244-7400	Laidlaw	800-345-1019	0.00	0
Florida	Sumter County	04/14 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	100001bs 100
Florida	Sumter County	04/17 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	10,0001bs. 100
Florida	Vero Beach	04/18 /90	Indian River Cty.	Ronald Brooks	407-567-8000	Laidlaw	800-345-1019	0.00	0
Florida	Levy County(2dy)	04/20 /90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-345-1019	0.00	22,150lbs. 132
Florida	Naples	04/20 /90	Collier County	David Russell	813-774-8477	Laidlaw	800-345-1019	0.00	0
Florida	Martin County	04/27 /90	Martin County			Laidlaw	800-345-1019	0.00	0
Florida	Ocala	05/12 /90	Marion County	Bill Lycan	904 245-6530			0.00	0
Florida	Cantonment	05/19 /90	Escambia County SWD	Lee Nelson	904-968-6628	Laidlaw	800-345-1019	0.00	0
Florida	Sebring	06/02 /90	Highlands Cty. SWD	Marty Kelly	813-655-1626			0.00	14,260 lbs. 296
Florida	Orlando(2dy)	06/09 /90	Orange Cty. Env.Prot	Nick Sassic	407-244-7400			0.00	1000
Florida	Vero Beach(2dy)	06/15 /90	Indian River Cty. Ut	Ms. Sam Rohlfing	407-567-8000			0.00	260
Florida	Sanford	06/16 /90	Seminole County SW	John Hauserman	407-322-7605			0.00	0
Florida	Key West(2dy)	07/13 /90	Monroe Cty.Mun.Serv.	Ron Stack	305-296-9680			0.00	0
Florida	Punta Gorda(2dy)	07/20 /90	Charlotte County SW	Jim Thomson	813-639-1349			0.00	0
Florida	Cantonment	07/21 /90	Escambia County	Sgt. Lee Nelson	904/968-6628			0.00	0
Florida	Delray Beach	07/24 /90	Palm Beach County	David Gregory	407-471-5770	Laidlaw	800-345-1019	0.00	0
Florida	Key West	07/27 /90	Monroe County	Charles Aguero	305-296-9630	Laidlaw	800-345-1019	0.00	0
Florida	Orlando	08/03 /90	Orange County	Nick Sassic	407-244-7400	Laidlaw	800-345-1019	0.00	0

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Florida	Escambia County(2dy)	08/10	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Indian River County/	08/15	/90	Indian River County	Ronald Brooks	407-567-8000	Laidlaw	800-845-1019	0.00		0
Florida	Santa Rosa County	08/15	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Santa Rosa County(2d	08/17	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Okaloosa County	08/22	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Okaloosa County(2dy)	08/24	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Orlando	08/02	/90	Orange County	Nick Sassic	407-244-7400	Laidlaw	800-845-1019	0.00		0
Florida	Walton County	09/05	/90	Amnesty Days	Jeanne White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Walton County(2dy)	09/07	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Holmes County(2dy)	09/09	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Bay County	09/12	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Alachua County (3 da	09/13	/90		Jan Kleman	904-488-0300	Laidlaw	800-845-1019	0.00		0
Florida	Bay County(2dy)	09/14	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Seminole	09/14	/90	Pinellas County	Lynne Peck	813-462-3147	Laidlaw	800-845-1019	0.00		0
Florida	Washington County	09/15	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Indian River County/	09/15	/90	Indian River County	Ronald Brooks	407-567-8000	Laidlaw	800-845-1019	0.00		0
Florida	Stuart(2dy)	09/21	/90	Martin County	Donna Trude	407-288-5779	Laidlaw	800-845-1019	0.00		0
Florida	LaBelle	09/21	/90	Highlands Co./Hendry	Christy Reed	813-655-4055	Laidlaw	800-845-1019	0.00		0
Florida	Dunedin(2dy)	09/21	/90	Pinellas County	Lynne Peck	813-462-3147	Laidlaw	800-845-1019	0.00		0
Florida	Wachula	09/22	/90	Highlands Co./Hardee	Christy Reed	813-655-4055	Laidlaw	800-845-1019	0.00		0
Florida	Clewiston	09/22	/90	Highlands Co./Hendry	Christy Reed	813-655-4055	Laidlaw	800-845-1019	0.00		0
Florida	Duval County(2dy)	09/28	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Sarasota	09/30	/90	County of Sarasota	Dennis Laabs	813-364-4488			0.00		0
Florida	Duval County(2dy)	10/05	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	St. Johns County(2dy	10/12	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Baker County(2dy)	10/13	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Nassau County(2dy)	10/18	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Tallahassee	10/20	/90	Amnesty Days	Jeanne White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Orlando	10/20	/90	Orange County	Nick Sassic	407-244-7400	Laidlaw	800-845-1019	0.00		0
Florida	Harwood	10/21	/90	Montgomery Cty Govt	Bob Wilson	301-840-2370	Laidlaw	800-845-1019	0.00		0
Florida	Sarasota	10/30	/90	County of Sarasota	Dennis Laabs	813-364-4488			0.00		0
Florida	Tallahassee	10/30	/90	Amnesty Days	Jeanne White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Clay County/Green Co	11/01	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Clay County/Orange P	11/02	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Putnam County(2dy)	11/09	/90	Amnesty Days	Jeane White	904-488-1090	Laidlaw	800-845-1019	0.00		0
Florida	Charlotte County	11/14	/90	Charlotte County	Matthew DeBoer	813-743-1378	Laidlaw	800-845-1019	0.00		0
Florida	Flagler County(2dy)	11/16	/90	Amnesty Days	Jeane White	904-488-0190	Laidlaw	800-845-1019	0.00		0
Florida	Ocala	11/18	/90	Marion County	Bill Lycan	904 245-6530			0.00		0
Florida	Naples	11/30	/90	Collier County	David Russell	813-774-8477	Laidlaw	800-845-1019	0.00		0
Florida	Sebring	12/01	/90	Highlands Co.	Christy Reed	813-655-4055	Laidlaw	800-845-1019	0.00		0
Florida	Orlando	12/01	/90	Orange County	Nick Sassic	407-244-7400	Laidlaw	800-845-1019	0.00		0
Florida	Stanford	Sprin	/90	Seminole County Sol.	Chris Pappas	407 322-7805			0.00		0
Idaho	Moscow	04/23	/90	Latah Sanitation	Kalene Johnson		ChemSafe-Nick Smith	509 968-3973	0.00	A-freeze-1dm,oil-5dm	150
Idaho	Boise	05/19	/90	County Health Dept.	Dave Neil	208 853-1297	ChemSafe-Nick Smith	509 968-3973	0.00	24labpacks,12drums"	1000
Idaho	Ada County	05/19	/90	Dept. of Hazardous W	Kathy Ewart	208-334-5879			0.00		0
Illinois	Vienna	03/17	/90	I.E.P.A.	Will Flower	217 782-5562	SET Envr. Services	708-537-9221	10000.00	10 drums	25
Illinois	Champaign	04/07	/90	I.E.P.A.	Will Flower	217 782-5562	SET Envr.Services	708-537-9221	150000.00	274 drums	564
Illinois	Springfield	04/21	/90	I.E.P.A.	Will Flower	217 782-5562	SET Envr. Services	708-537-9221	250000.00	620 drums	650
Illinois	Rockford	04/28	/90	I.E.P.A.	Will Flower	217 782-5562	SET Envr. Services	708-537-9221	200000.00	537 drums	771
Illinois	Naperville	05/05	/90	I.E.P.A.	Will Flower	217 782-5562	SET Envr. Services	708-537-9221	280000.00	283 drums,2 dumpster	1046
Illinois	Rock Island	05/19	/90	I.E.P.A.	Will Flower	217 782-5562	SET Envr. Services	708-537-9221	160000.00	240 drums	729
Illinois	Chicago	05/15	/90	I.E.P.A./City	Dan Rion	217-782-6761	SET Environmental	708-537-9221	0.00	45 drums	125
Illinois	Park Ridge County	05/29	/90	I.E.P.A./County	Dan Rion	217-782-6761	SET Environmental	708-537-9221	0.00		337
Illinois	Pekin	10/13	/90	I.E.P.A/County	Dan Rion	217-782-6761	SET Environmental	708-537-9221	0.00		0
Illinois	Effingham	10/27	/90	I.E.P.A./County	Dan Rion	217-782-6761	SET Environmental	708-537-9221	0.00		0
Indiana	Ft. Wayne	03/13	/90	Chemical Waste Mgmt.	David Camperman	219-423-7103	Chemical Waste Mgmt.	708-389-9543	0.00		0
Indiana	Indianapolis 0	04/23	/90	Dept. of Public Work	Alva Faulbee	317 236-5411	Heritage Remediation	317-243-0811	130000.00	10000gallons oil	1200
Indiana	Richmond County	05/12	/90	Richmond Sanitary Di	David Perkins	317-973-9399	Laidlaw	800-845-1019	12700.00		0
Indiana	Richmond	05/12	/90	Wayne County	David Perkins	317-973-9399	Laidlaw	800-845-1019	0.00		0

STATE		LOCATION			TE	PONSOR	CONTAC	PHONE	H		I		WAST		PART
Indiana		Indianapolis	05/26	/90	DPW		Alva Taulbee	317-236-5411	Heritage Remediation	317-236-4400		0.00			0
Indiana		Indianapolis	06/20	/90	Dept. of Public Work		Alva Taulbee	317 236-5411	Heritage Remediation	One Saturday		0.00	a month for 4 months		0
Indiana		Indianapolis	07/23	/90	DPW		Alva Taulbee	317-236-5411	Heritage Remediation	317-236-4400		0.00			0
Indiana		Indianapolis	08/25	/90	DPW		Alva Taulbee	317-236-5411	Heritage Remediation	317-236-4400		0.00			0
Indiana		Garfield ?	09/22	/90	DPW		Sarah Gas	317-236-4400	Heritage Remediation	317-236-4400		0.00			0
Indiana		Ft. Wayne	3/18	/90	Chemical Waste Mgmt.		David Camperman	219-428-7108	Chemical Waste Mgmt.	708-369-9543		0.00			0
Iowa		Webster City/Hamilto	05/12	/90	IDNR/Hamilton County		Robert Ribbens	515-281-8382	Chemical Waste Mgt.	708 369-9543		78072.00	2008 gallons		504
Iowa		Waterloo/Black Hawk	05/12	/90	Black Hawk Cty.S.W.C		Robert Ribbens	515-281-8382	Chemical Wst. Mgt.	708 369-9543		67272.00	1928 gallons		565
Iowa		Sioux City/Woodbury	05/19	/90	IDNR/Sioux-Woodbury		Robert Ribbens	515-281-8382	Chemical Waste Mgt.	708-369-9543		98436.00	2152 gallons		52500
Iowa		Marshalltown/County	06/02	/90	IDNR/Marshall County		Robert Ribbens	515-281-8382	Chemical Waste Mgt.	708-369-9543		75771.00	2825 gallons		420
Iowa		Ottumwa	06/02	/90	Iowa DNR		Robert Ribbens	515-281-8382	Chemical Waste Mgt.	708-369-9543		48161.00	1310 gallons		465
Iowa		Desmoines	10/08	/90	Desmoines Metro SWA		Kathy Witkovski	515-244-0021	Chemical Waste Mgmt.	708-369-9543		0.00			0
Kansas		Manhattan	04/21	/90	Riley Cty. Pub. Work		Monty Wedel	913-537-6332	Laidlaw	800-251-1227		54200.00	none yet		0
Kansas		Cico Park	04/21	/90	Riley Cty Pub.Wks,'St		Monty Wedel	913 537-6332	Laidlaw	800 251-1227		37920.00	5563 pounds		462
Kansas		Riley County	04/21	/90	State/Town		Kathleen Warren	913-296-1611	Laidlaw	800-845-1019		37920.00	1370 gallons		460
Kansas		Olathe'	04/28	/90	State/Local		Kathleen Warren	913-296-1611	Laidlaw	800-845-1019		10434.00	N/A		26
Kansas		Phillips County	05/17	/90	State/Local		Kathleen Warren	913-296-1611	Laidlaw	800-845-1019		4685.00	335 gallons		14
Kansas		Rooks County	05/18	/90	State/Local		Kathleen Warren	913-296-1611	Laidlaw	800-845-1019		2939.00	N/A		20
Kansas		Reno(2dy)	05/18	/90	State/Local		Kathleen Warren	913-296-1611	Laidlaw	800-845-1019		38336.00	4905 gallons		520
Kansas		Ellis County	05/19	/90	State/Local		Kathleen Warren	913-296-1161	Laidlaw	800-845-1019		6350.00	927 gallons		51
Kansas		Riley Cty Weed Dept.	06/	/90	Riley Cty Public Wor		Monty Wedel	913 537-6332	Laidlaw	800-845-1019		0.00			0
Kansas		Olathe'	07/07	/90	State/Local		Kathleen Warren	913-296-1611	Laidlaw	800-845-1019		40000.00			0
Kansas		Riley County	09/	/90	County/State		Monty Wedel	913-537-6332	Chemical Waste Mgmt.	201-465-6848		0.00			0
Kansas		Manhattan'	10/	/90	Riley County Plan&Zo		Monty Wedel	913-537-6332	Chemical Waste Mgmt.	708-369-9543		42000.00			0
Kansas		Barton County'	10/	/90	State/Local		Kathleen Warren	913-296-1611				40470.00			0
Kansas		Wichita/Sedgwick'	10/	/90	State/Local		Kathleen Warren	913-296-1611				50000.00			0
Kansas		Ellis County	10/	/90	County/State		Kathleen Warren	913-296-1611				20000.00			0
Kansas		Reno County	10/	/90	County/State		Kathleen Warren	913-296-1611				25000.00			0
Kentucky		6 sites - Louisville	04/21	/90	Louisville, MSD		Bob Schindler	502 625-6602	Laidlaw	800-845-1019		315487.00	900drms-HHW,1100gals		2300
Kentucky		Calvert-Marshall Cou	04/21	/90	LWD, Inc.		Gary Metcalf	502-395-9313	LWD, Inc.	502-395-9313		2500.00	4 drums		18
Kentucky		Carolton-Carol Count	04/21	/90	AutoChem-Carol Count		Liz Gillesty	502-732-4411	Chemical Waste Mgt.	201-465-6848		0.00			0
Kentucky		Hazard E	05/01	/90	Perry County Coop Se		Roy Turley	606-436-2044				0.00			0
Louisiana		Baton Rouge	03/	/90			Charles Graves	504-389-5767	Dow Chemical			0.00	20000 pounds HHW		0
Louisiana		Southwest Louisiana#	10/24	/90	LA Dept. Agr.&Forest		Larry Lejuene	504-925-3765	Chemical Waste Mgmt.	318-582-2169		0.00			0
Maine		South Portland	05/	/90	Clean Harbors,City		Guy Lambert	207-799-5111	Clean Harbors	207-799-5111		15000.00	40 drums		125
Maine		South Portland	06/05	/90	Town/Clean Harbors		Guy Lambert	207 799-5111	Clean Harbors			0.00			0
Maine		Sanford	05/01	/90	Cyro Ind.		Guy Lambert	207-799-5111	Clean Harbors	207-799-5111		19000.00			130
Maine		Eliot	09/26	/90	Town of Eliot		Fred Breslin		Clean Harbors	207-799-5111		25000.00			100
Maine		Montague	11/17	/90	Town of Montague		Glenn Angell	207-289-2651	Clean Harbors	508-655-9963		0.00			0
Maine		statewide pickup#	Jan	/90	Maine Ed. Pest.Contl		Henry Jennings	207-289-2731	Clean Harbors Maine	207-799-5111		50000.00	3315 lbs.		100
Maryland		Calvert County '		/90	Cal. Cty. Solid Wast		Dan Williams	301-535-2204	ERI			500.00	6 and antifreeze		0
Maryland		Ozen Hill High Schoo	03/24	/90	Dept.Env.Rec.		Ron Stotz	301-957-4729	Laidlaw	800-845-1019		64000.00	18585lbs.		403
Maryland		Anne Arundel County	04/07	/90	County		Amy Burdict	301-244-7058	Laidlaw	800-845-1019		175000.00	113,000lbs.		1025
Maryland		Westminster	04/21	/90	Cty.Commisioners,'Car		George Thomas	301-857-2181	Laidlaw	800-845-1019		0.00			0
Maryland		Balt.Cty.(1st)+	05/01	/90	Baltimore County		Thomas Bodrogi	301-887-3745				0.00			0
Maryland		Anne Arundel County	10/00	/90	County		Amy Burdict	301-244-7058	Laidlaw	800 845 1019		0.00			0
Maryland		Upper Marlboro	10/14	/90	Prince Georgia Count		Jonathan Phillips	301-952-4612	Laidlaw	800-845-1019		0.00			0
Maryland		Derwood	10/21	/90	Montgomery Cty Govt		Bob Wilson	301-840-2370	Laidlaw	502-683-1002		0.00			0
Maryland		Frederick County	10/28	/90	Frederick County		Karen Roof	301-631-3305	Laidlaw	508-683-1002		0.00	183 barrels		0
Massachusetts		Southampton	03/24	/90	Southampton		Patrick O'Toole	508-655-9963	Clean Harbors	508-655-9963		7000.00			0
Massachusetts		Danvers	04/14	/90	Danvers		Tracy Flagg	508-777-0001	Laidlaw Northeast	508-683-1002		0.00			180
Massachusetts		Foxborough	04/14	/90	Foxborough		George Young	508-543-1207	Laidlaw Northeast	508-683-1002		0.00			250
Massachusetts		Pembroke	04/14	/90	Pembroke		Phil Spath	617-293-2718	Laidlaw Northeast	508-683-1002		0.00			193
Massachusetts		Natick	04/21	/90	Natick		Patrick O'Toole	508-655-9963	Clean Harbors	508-655-9963		25000.00			0
Massachusetts		Truro	04/21	/90	Truro		Patrick O'Toole	508-655-9963	Clean Harbors	508-655-9963		7000.00			0
Massachusetts		Acton	04/21	/90	Town of Acton		Steven Ward	508-264-9624	Laidlaw Northeast	508-683-1002		0.00			92
Massachusetts		Nantucket	04/21	/90	Nantucket		Elise Nawrocki	508-228-7244	Laidlaw Northeast	508-683-1002		0.00			120
Massachusetts		West Springfield	04/22	/90	Board of Health		Albert Labaloni		Laidlaw Northeast	508-683-1002		0.00			0
Massachusetts		Methuen	04/23	/90	Town of Methuen		Patrick O'Toole	508-655-9963	Clean Harbors	508-655-9963		25000.00			0

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STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Massachusetts	Barnstable	04/23	'90	Town	Jerry Rafferty	508-775-1120	Laidlaw Northeast	508-683-1002	0.00		260
Massachusetts	South Hadley	04/28	'90	South Hadley	Phil Pattison	413-538-5003	Laidlaw Northeast	508-683-1002	0.00		157
Massachusetts	Weymouth	04/28	'90	Weymouth	Joe Mazetta	617-337-5100	Laidlaw Northeast	508-683-1002	0.00		502
Massachusetts	Mansfield	04/29	'90	Mansfield Board Heal	Scott Leite	508-261-7388	Triumvirate Environ.	617-328-9282	3240.00	21-55gall-5galpail 1	0
Massachusetts	Brewster	05/05	'90	Town	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-9836	15000.00		0
Massachusetts	Oxford	05/05	'90	Oxford	Nick Roos	203-997-2651	Laidlaw Northeast	508-683-1002	0.00		0
Massachusetts	Brockton	05/12	/90	Town of Brockton	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	0.00		28
Massachusetts	Norwood	05/12	/90	Town of Norwood	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	20000.00		0
Massachusetts	Winchester	05/12	/90	Winchester	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	12500.00		0
Massachusetts	Wilmington	05/12	/90	Wilmington	Bob Palmer	508-658-4481	Clean Harbors	508-655-8863	25000.00		0
Massachusetts	Worcester	05/19	/90	City of Wor./DPW	Richard A.Schnerf	508-799-1430	Laidlaw Northeast	508-683-1002	0.00		196
Massachusetts	Cambridge	05/19	/90	Cambridge	Patrick O'Toole	508-655-8863	N.E.I.W.	401-943-5300	77504.70	102 drums	480
Massachusetts	Attleboro	05/19	/90	Attleboro	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	25000.00		0
Massachusetts	Amherst	05/19	/90	Amherst	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	25000.00		0
Massachusetts	Sudbury	05/19	/90	Town of Sudbury	Mike Bartholomew	508-460-9960	Clean Harbors	508-655-8863	20000.00		0
Massachusetts	Wrentham	05/19	/90	Wrentham	Maureen Osulnik		AETC	508-460-9960	2087.05		0
Massachusetts	Boston	05/19	/90	City	Denise Brietenricher	617-725-4417	Laidlaw Northeast	508-683-1002	0.00		27
Massachusetts	Boylston	05/19	/90	Town	Dennis Costello	508-869-6459	Laidlaw Northeast	508-683-1002	0.00		423
Massachusetts	Dover, Sherborn, Medfi	06/02	'90	3 Towns	Patrick O'Toole	508-655-8863	Laidlaw Northeast	508-683-1002	0.00		10
Massachusetts	Maynard	06/08	/90	Maynard Board of Hea	Jerry Collins	508-897-1002	Clean Harbors	508-655-8863	12500.00		0
Massachusetts	Canton	06/09	/90	Town of Canton	Patrick O'Toole	508-655-8633	Triumvirate Environ.	617-328-9282	1000.00	12-55gal 2-5gal pail	0
Massachusetts	Holden	06/09	/90	Town of Holden	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8633	15000.00		0
Massachusetts	Easthampton	06/09	/90	Easthampton	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	12000.00		0
Massachusetts	Burlington	06/09	/90	Burlington	Richard Lombard	617-272-6700	Clean Harbors	508-655-8863	15000.00		0
Massachusetts	Westfield	06/09	/90	Westfield Board Heal	Margaret Moody	508-568-9131	Laidlaw Northeast	508-683-1002	0.00		327
Massachusetts	Stoughton	06/09	/90	Town of Stoughton	James B. Conlon	617-341-1300	Triumvirate Environ.	617-328-9282	0.00	10-55gal32-30gal19-1	0
Massachusetts	Peabody	06/16	/90	Peabody	Peter Angerane		Triumvirate Environ.	617-328-9282	16123.37	30-55gal14-30gal1-16	0
Massachusetts	Sharon	06/20	/90	Town of Sharon DPW	John Sulik	617-784-5961	Laidlaw Northeast	508-683-1002	0.00		228
Massachusetts	Yarmouth	06/23	/90	Yarmouth	Patrick O'Toole	508-655-8863	Triumvirate Environ.	617-328-9282	40021.18	92-55gal 24lbs react	0
Massachusetts	Eastham/Wellfleet	06/23	/90	2 Towns	Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	19000.00		0
Massachusetts	Edgartown	07/21	/90	Edgartown	Kate Gage		Clean Harbors	508-655-8863	10000.00		0
Massachusetts	Nantucket	08/25	/90	Nantucket	Patrick O'toole	508-655-8863	Laidlaw NE	508-683-1002	0.00		0
Massachusetts	Dalton	09/08	/90	Dalton	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Cohasset	09/15	/90	Town of Cohasset	Joseph Godzik	617-383-9900	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Sturbridge*	09/15	/90	Sturb.Board of Healt	George Berry	508-347-2504	Laidlaw	508-683-1002	0.00		0
Massachusetts	Brockton	09/15	/90	City of Brockton	Patrick O'toole	508-655-8863	Laidlaw Northeast	508-683-1002	0.00		0
Massachusetts	Bedford	09/15	/90	Town of Bedford	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Northampton*	09/15	/90	Northampton Board Hl	Alison Leschen	413-586-6950	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Martha's Vineyard*	09/22	/90	MV Refuse Disp.Dist.	Russell Smith	508-693-3479	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Monroe/Easton/Trumbu	09/22	/90	Monroe/Easton/Trumbu	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	63080.00		200
Massachusetts	Harvard	09/22	/90	Town of Harvard	Patrick O'toole	508-655-8863	Laidlaw Northeast	508-683-1002	0.00		0
Massachusetts	Stow	09/29	/90	Town of Stow	Dave Caplan	508-897-4592	Clean Harbors	508-655-8863	0.00		0
Massachusetts	East Springfield	09/29	/90	Town of E. Springfiel	Patrick O'toole	508-655-8863	Laidlaw	508-683-1002	0.00		0
Massachusetts	Easthampton	09/29	/90	Town of Easthampton	Patrick O'toole	508-655-8863	Clean Harbors	508-688-8863	0.00		0
Massachusetts	Chatam	09/29	/90	Town of Chatam	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Littleton	10/06	/90	Town of Littleton	Eric Burling	508-486-3778	Clean Harbors	508-655-9563	0.00		0
Massachusetts	Newburyport	10/06	/90	Town of Newburyport	Kip Berkowicz		Triumvirate Environ.	617-328-9282	14530.00		0
Massachusetts	Andover	10/06	/90	Town of Andover	Patrick O'toole	508-655-8863	Laidlaw	508-683-1002	0.00		0
Massachusetts	Taunton	10/13	/90	Town of Taunton	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Weston	10/13	/90	Town of Weston	Patrick O'toole	508-655-8863	Clean Harbors	508-655-9563	0.00		0
Massachusetts	Southwick	10/20	/90				Clean Harbors	508-655-9563	0.00		0
Massachusetts	Fall River	10/20	/90	Town of Fall River	Patrick O'toole	508-655-8863	Triumvirate Environ.	617-328-9282	0.00		0
Massachusetts	Brookline	10/20	/90	City of Brookline	Patrick O'toole	508-655-8863	Clean Harbors	508-655-9563	0.00		0
Massachusetts	Haverhill	10/20	/90	City of Haverhill	Donna Leone	508-374-2325	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Nantucket	10/27	/90	Town of Nantucket	Patrick O'toole	508-655-8863	Laidlaw	508-683-1002	0.00		0
Massachusetts	Lincoln	10/27	/90	Town of Lincoln	Patrick O'toole	508-655-8863	Clean Harbors	508-655-9563	0.00		0
Massachusetts	Belmont	10/27	/90	Town of Belmont	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00		0
Massachusetts	Norton	10/27	/90	Town of Norton	Patrick O'toole	508-655-8863	Clean Harbors	508-655-9563	0.00		0
Massachusetts	Oxford(2 towns have	11/01					Clean Harbors	508-655-9563	0.00		0
							Triumvirate Environ.	617-328-9282	0.00		0

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STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	PHONE	HAULER	PHONE	WASTE	PARTI
Massachusetts	Templeton	11/03	/90				Triumvirate Environ.	617-328-9282	0.00	0
Massachusetts	Tewksbury	11/03	/90	Town of Tewksbury	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00	0
Massachusetts	Norwell	11/03	/90	Town of Norwell	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00	0
Massachusetts	Westport	11/03	/90	Town of Westport	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00	0
Massachusetts	Marshfield	11/17	/90	Town of Marshfield	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00	0
Massachusetts	Lowell	11/17	/90	City of Lowell	Patrick O'toole	508-655-8863	Clean Harbors	508-655-8863	0.00	0
Massachusetts	Northampton*	11/17	/90	Northampton Board of	Alison Leschen	413-586-6960	Clean Harbors	508-655-8863	0.00	0
Massachusetts#	Concord	00/00	/90	MA Farm Bur/Coalitio	John Bragg	617-275-4374	Clean Harbors	508-650-7372	0.00	0
Massachusetts#	Lenox	00/00	/90	MA Farm Bur/Coalitio	John Bragg	617-275-4374	Clean Harbors	508-650-7372	0.00	0
Massachusetts#	Northampton*	00/00	/90	MA Farm Bur/Coalitio	John Bragg	617-275-4374	Clean Harbors	508-650-7372	0.00	0
Massachusetts#	Wareham	00/00	/90	MA Farm Bur/Coalitio	John Bragg	617-275-4374	Clean Harbors	508-650-7372	0.00	0
Massachusetts#	Lancaster	00/00	/90	MA Farm Bur/Coalitio	John Bragg	617-275-4374	Clean Harbors	508-650-7372	0.00	0
Michigan	Macomb County*		/90	Macomb County Hlth.D	Robert MacDonald	313-469-5238			0.00	0
Michigan	Kalamazoo County*		/90	Kalamazoo Cty.Man.So	Tom Doshirst	613-384-8004			0.00	0
Michigan	Ingham County*		/90	County Health Dept.	Bob Core	517-887-6988			0.00	0
Michigan	Kent County*		/90	Dept.Pub.Works	Donna Engstrom	616-774-6892			0.00	0
Michigan	Oakland County H		/90	County Res.Rec.Autho			Self-Contracted		0.00	0
Michigan	Bay City*(5/yr)		/90	Bay County Health De	Robert M. Hill	517-894-0645	Dow Chemical U.S.A.	517-636-6766	0.00	139 drums @ 200 lb/d 289
Michigan	Saginaw County*(5/yr		/90	Saginaw County Healt	Bryant J. Wilke	517-771-0828	Dow Chemical U.S.A	517-636-6766	0.00	77 drums @ 200 lb/dr 140
Michigan	Midland City*(6/yr)		/90	Midland County Healt	Douglas Blak	517-832-6655	Dow Chemical U.S.A.	517-636-6766	0.00	210 drums @ 200 lb/d 349
Michigan	Port Huron & Clay Tw	01/01	/90	St. Clair County	Robin L. Krenke	313-327-6178	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan	Kalamazoo	03/16	/90	Human Services Dept.			Drug & Lab	616 685-9824	3322.75	0
Michigan	Kent	03/21	/90	Dept. of Public Work	Rhonda Sybesma	616 685-9824	Drug & Lab	616 685-9824	6838.00	0
Michigan	Ingham County	03/21	/90	County of Ingham	Bob Core	517-887-6988	Drug & Lab	616 685-9824	3029.00	0
Michigan	Macomb	03/28	/90	County Health Dept.	Rob McDonald	313-469-5467	Drug & Lab	616 685-9824	7112.00	0
Michigan	Lenawee	03/31	/90	County of Lenawee	Rhonda Sybesma	616 685-9824	Drug & Lab	616 685-9824	4032.00	0
Michigan	Kalamazoo	04/20	/90	Human Services Dept.	Lynn Sparr	616-685-9886	Drug & Lab	616 685-9824	0.00	0
Michigan	Isabella County	04/21	/90	Cty Dept. of RecycliN	Bruce Rohrer	517-772-0911	Drug & Lab	616 685-9824	26500.00	0
Michigan	Antrim	04/21	/90	County of Antrim	Rhonda Sybesma	616 685-9824	Drug & Lab	616 685-9824	2212.00	0
Michigan	Leelanau	04/21	/90		Rhonda Sybesma	616 685-9824	Drug & Lab	616 685-9824	4409.00	0
Michigan	Grand Travers-3 ctys	04/21	/90	County of Grand Trav	Roger Williams	616-922-4676	Drug & Lab	616 685-9824	4864.00	0
Michigan	Bay County	04/26	/90	Mich.Div.of Dow Chem	Robert Hill	517-894-0645	Dow Chemical	517-636-6766	15000.00 6860 lbs.	64
Michigan	Grand Blank	04/28	/90	City of Grand Blank	Rhonda Sybesma	616 685-9824	Drug & Lab	616 685-9824	16965.00	0
Michigan	Washtenaw	04/28	/90	County Health Dept.	Steve Knaville	313-994-2492	Drug & Lab	616 685-9824	5362.00	0
Michigan	Kalamazoo	05/12	/90	Human Services Dept.	Lynn Sparr	616-685-9886	Drug & Lab	616 685-9824	0.00	0
Michigan	Manhaton	05/19	/90	Dept. of Public Work	Rhonda Sybesma	616 685-9824	Drug & Lab	616 685-9824	0.00	0
Michigan	Southfield	05/19	/90	City of Southfield	Laurie Alpers	313-351-5846	Chemical Waste Mgmt.	708-389-9543	0.00	0
Michigan	Bay County	05/24	/90	Mich.Div.of Dow Chem	Robert Hill	517-894-0645	Dow Chemical	517-636-6766	7000.00	28
Michigan	Washtenaw County	06/20	/90	County Health Dept.	Steve Knaville	313-994-2492	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan	Washtenaw Coutaty	06/27	/90	County Health Dept.	Steve Knaville	313-994-2492	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan	Bay County	07/14	/90	Mich.Div.of Dow Chem	Robert Hill	517-894-0645	Dow Chemical	517-636-6766	0.00	0
Michigan	Bay County	08/18	/90	Mich.Div.of Dow Chem	Robert Hill	517-894-0645	Dow Chemical	517-636-6766	0.00	0
Michigan	Genesee County	09/29	/90	County of Genesee	Mark Valacak	313-257-3577	Drug & Lab Disposals	616-685-9824	0.00	0
Michigan	Bay County	10/02	/90	Mich.Div. of Dow Che	Robert Hill	517-894-0645	Dow Chemical	517-636-6766	0.00	0
Michigan	City of Holland	10/06	/90	City of Holland	Roger Streit	616-394-1365	Drug & Lab Disposals	616-685-9824	0.00	0
Michigan	Southfield	10/27	/90	City of Southfield	Laurie Alpers	313-351-5846	Chemical Waste Mgmt.	708-389-9543	0.00	0
Michigan#	Lenawee	09/25	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Monroe	09/25	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Gran Travers County	11/03	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Kalkaska	11/03	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Antrim	11/03	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Leelanau	11/03	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Huron	11/03	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Delta County	11/06	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Alpena County	11/09	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lag Disposal	616-685-9824	0.00	0
Michigan#	Presque Isle	11/09	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Monatmorency	11/09	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Cheboygan	11/09	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0
Michigan#	Berrien County	12/	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00	0

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Michigan#	Cass	12/	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00		0
Michigan#	St. Joseph	12/	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00		0
Michigan#	Van Buren	12/	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00		0
Michigan(2dy)#	Mason County	11/07	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00		0
Michigan(2dy)#	Muskegon	11/07	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00		0
Michigan(2dy)#	Oceana	11/07	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00		0
Michigan(2dy)#	Newago	11/07	/90	MI Dept. of Agricult	Charlie Cubbage	517-373-1087	Drug & Lab Disposal	616-685-9824	0.00		0
Minnesota	Willmar*		/90	MPCA/Kandiyohi Count	Mary Catherwood	612-235-9678	Aptus	612-469-3457	0.00		0
Minnesota	Marshall*		/90	MPCA/Lyon County	Tracy Scalek		Aptus	612-469-3457	0.00		0
Minnesota	Winona*		/90	MPCA/Winona County	Anne Thorson	507-457-6460	Aptus	612-469-3457	0.00		0
Minnesota	Rochester*		/90	MPCA/Olmstead County	Dave Walter	507-285-8231	Aptus	612-469-3457	0.00		0
Minnesota	Duluth*		/90	MPCA/WCSSO	Julie O'Leary	218-722-3868	Aptus	612-469-3457	0.00		0
Minnesota	Hennepin County B		/90	MPCA	Don Soeberger	612-348-6157	Mercury Refining	800-833-2505	0.00		0
Minnesota	Winona	04/21	/90	MPCA/Winona County	Mike Martindale	612-643-3492	Aptus	612-469-3457	0.00		0
Minnesota	Rochester	05/19	/90	MPCA/Rochester Count	Mike Martindale	612-643-3492	Aptus	612-469-3457	0.00		0
Minnesota	St. Louis County	06/02	/90	MPCA/St. Louis Count	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	Two Harbors	06/07	/90	MPCA/Lake County	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	St. Louis County	06/09	/90	MPCA/St. Louis Count	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	St. Charles	06/16	/90	MPCA/Winona County	Mike Martindale	612-643-3492	Aptus	612-469-3457	0.00		0
Minnesota	Carlton	06/16	/90	MPCA/Carlton County	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	Grand Marais	06/23	/90	MPCA/Cook County	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	Brooklyn Park*	06/06	/90	Hennepin County	Greg Leigh	612-348-2556	Aptus	612-469-3457	0.00		0
Minnesota	Barnum	06/11	/90	MPCA/Carlton County	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	Hibbing	06/25	/90	MPCA/St. Louis Count	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	Silver Bay	06/08	/90	MPCA/Lake County	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	Wabasha	06/06	/90	MPCA/Wabasha County	Mike Martindale	612-643-3492	Aptus	612-469-3457	0.00		0
Minnesota	Grand Marais	06/15	/90	MPCA/Cook County	Dean Blixt	612-643-3494	Aptus	612-469-3457	0.00		0
Minnesota	Slayton	06/15	/90	MPCA/Pipestone County	Donna Portner	612-643-3471	Aptus	612-469-3457	0.00		0
Minnesota	Benson	06/20	/90	MPCA/Swift County	Donna Portner	612-643-3471	Aptus	612-469-3457	0.00		0
Minnesota	Dodge Center	06/22	/90	MPCA/Dodge City	Mike Martindale	612-643-3492	Aptus	612-469-3457	0.00		0
Minnesota	Jackson County	06/29	/90	MPCA/Jackson County	Donna Portner	612-643-3471	Aptus	612-469-3457	0.00		0
Minnesota	Yellow Medicine Coun	06/29	/90	MPCA/Yellow Med.Coun	Donna Portner	612-643-3471	Aptus	612-469-3457	0.00		0
Minnesota	Brooklyn Center	10/	/90	Hennepin County	Greg Leigh	612-348-2556	Chemical Waste Mgmt.	708-369-9543	0.00		0
Minnesota	Nobles County	10/04	/90	MPCA/Nobles County	Donna Portner	612-643-3471	Aptus	612-469-3457	0.00		0
Minnesota	S. Minneapolis	10/13	/90	Hennepin County	Greg Leigh	612-348-2556	Chemical Waste Mgmt.	708-369-9543	0.00		0
Minnesota	Bloomington	10/13	/90	Hennepin County	Greg Leigh	612-348-2556	Chemical Waste Mgmt.	708-369-9543	0.00		0
Minnesota#		11/05	/90	MN Dept. of Agricult	Larry Palmer	612-297-7082	Chemical Waste Mgmt.	708-369-9543	0.00		0
Minnesota#		11/12	/90	MN Dept. of Agricult	Larry Palmer	612-297-7082	Chemical Waste Mgmt.	708-369-9543	0.00		0
Missouri	Southwest MR		/90	State MRR Project	Marie Steinmachs	417-836-5777	Mercury Refining	800-833-5777	0.00		0
Missouri	Columbia	04/23	/90	Missouri DNR	Bruce Martin	314 751-3176	Chemical Waste Mgt.	708-369-9543	68000.00		884
Missouri	Jefferson City	05/05	/90	Dept. Nat. Res./City	Bruce Martin	314 751-3176	Laidlaw	800-845-1819	41000.00		558
Missouri	Liberty	05/19	/90	Dept. Natl. Res./Cit	Bruce Martin	314 751-3176	Laidlaw	800-845-1819	19000.00		220
Missouri	West Plains	06/09	/90	Dept. Natl. Res./Wes	Bruce Martin	314 751-3176	Laidlaw	800-845-1819	0.00		0
Nebraska	Lincoln-Lancaster Ct	01/	/90	Lincoln-Lancaster Ct	Richard Slama	402-471-8037	Chemical Waste Mgmt.	708-369-9543	0.00		0
Nebraska	Lincoln-Lancaster Ct	04/18	/90	Lincoln-Lancaster Ct	Richard Slama	402-471-8037	Chemical Waste Mgt.	708-369-9543	12000.00	1215 lbs.	43
Nebraska	Lincoln-Lancaster Ct	04/28	/90	County of Lincoln	Richard Slama	402-471-8037	Chemical Waste Mgt.	708-369-9543	8700.00	10001bs.	27
Nebraska	Lincoln-Lancaster Ct	05/19	/90	Lincoln-Lancaster Ct	Richard Slama	402 471-8037	Chemical Waste Mgt.	708-369-9543	0.00	1800 lbs.	76
Nebraska	Lincoln-Lancaster Ct	06/08	/90	Lincoln-Lancaster Ct	Richard Slama	402 471-8037	Chemical Waste Mgmt.	708-369-9543	0.00		0
Nebraska	Omaha*	10/20	/90	Omaha/Douglas County	Paul Mullen	402-444-6866	Local Paint Company		0.00		0
New Hampshire	Concord#	04/26	/90	Dept. of Agriculture	Trish Hall	603 271-3550	Clean Harbors	508-655-7261	75000.00	10,0001bs, 1000gallo	89
New Hampshire	Peterborough (2 site	04/21	/90	Contoocook Valley HH	Scott Bowden	603-672-8241	Laidlaw Northeast	508-683-1002	23981.67	45-55 gal drums	162
New Hampshire	Antrim	04/21	/90	Contoocook County	Scott Bowden	603-588-2310	Laidlaw Northeast	508-683-1002	0.00		84
New Hampshire	Pease Air Force Base	05/05	/90		Patrick O'Toole	508-655-8863	Clean Harbors	508-655-8863	5000.00		0
New Hampshire	Hanover	05/05	/90	Upper Valley HHWC	Judy Bowden	603-448-1680	Laidlaw Northeast	508-683-1002	32809.04	53-55 gal drums	338
New Hampshire	Lebanon	05/05	/90	Upper Valley HHWD Co	Judy Bowden	603-448-1680	Laidlaw Northeast	508-683-1002	0.00		480
New Hampshire	Peterborough (2 site	05/12	/90	Contoocook County	Scott Bowden	603-588-2310	Laidlaw Northeast	508-683-1002	0.00		0
New Hampshire	Antrim	05/12	/90	Contoocook Valley HH	Scott Bowden	603-464-3011	Laidlaw Northeast	508-683-1002	0.00		162
New Hampshire	Keene	05/19	/90	Ashuelot Valley	Wendy Smith	603-357-3875	Clean Harbors	603 644 3833	23779.11		151
New Hampshire	New Boston	06/02	/90	New Boston Conserval	Michael Richard	603-487-2158	AETC	508-460-9960	15820.00	28-55 gal drums	113

	LOCATION	DATE	YEAR	SPONSOR	CONTACT	PHONE	HAULER	PHONE	COST	WASTE	PARTICIP
New Hampshire	Goffstown	06/02	/90	Town of Goffstown	Michael Parda	603-497-8990	AETC	508-460-9960	11225.80	1210 lbs	122
New Hampshire	Nashua, Hudson, Milf	06/09	/90	Nashua Reg. Pl. Comm	Lisa Hanlsef	603-883-0366	AETC	201-147-7111	49676.19	7425 lbs	450
New Hampshire	Meridoth(7 sites)	07/28	/90	Lakes Region Pl. Com	Jacquie Hlowell	603-279-8171	Laidlaw Northeast	508-683-1602	77283.80	153 drums 9165 lbs	1150
New Hampshire	Portsmouth	09/29	/90	Rockingham Pl. Comm.	Sarah Campbell	603-778-0885	Triumvirate Environ.	617-328-9282	0.00		0
New Hampshire	Conway-Transfer Stat	09/29	/90	Conway	Curtis Lant	603-447-3811			0.00		0
New Hampshire	Conway	09/29	/90	Town of Conway	Curtis Lant	603-447-3811	Laidlaw	508-683-1602	0.00		0
New Hampshire	Rochester	10/06	/90	Town of Rochester	Curtis Lant		Laidlaw	508-683-1602	0.00		0
New Hampshire	Rockingham Cty(3 sit	10/13	/90	Rockingham Pl. Comm.	Sarah Campbell	603-778-0885	Triumvirate Environ.	617-328-9282	0.00		0
New Hampshire	Bow and Warner	10/13	/90	Con N.H. Reg Pl. Con	Eric Williams	603-796-2129	Laidlaw	508-683-1602	0.00		0
New Hampshire	Rochester	10/13	/90	Strafford Reg Pl. Co	Bart George	603-332-4096			0.00		0
New Hampshire	Plymouth State Colle	10/13	/90	Pemi-Baker S.W. Dist	Emily Hess	603-444-6303	Laidlaw	508-683-1602	0.00		0
New Hampshire	Nashua/Milford/Merri	10/20	/90	Nashua Reg. Pl. Dist	Lisa Hanself	603-883-0366	AETC	508-460-9960	0.00		0
New Hampshire	Dover	10/27	/90	Strafford Reg. Pl. C	David Allen	603-742-4868	Clean Harbors	508-655-8863	0.00		0
New Jersey	Warren County DB		/90	Warren Cty. Pol.Cont	Mary Briggs	201-453-2174	Mercury Refining	800-833-3505	0.00		0
New Jersey	Mt. Claire	03/31	/90	Township of Mt. Clai			Radiac	718-963-2233	0.00	78 drums	0
New Jersey	Warren County	04/21	/90	Warren Cty. Pol. Con	Mary Briggs	201 453-2174	Env. Services		16500.30	10 Drums HHW	100
New Jersey	Monmouth County	04/21	/90	Monmouth Cty.Health	Myron LaVake	201-431-7456	Waste Conversion	215-822-8995	70000.00	40000lbs.	350
New Jersey	Somerset County	04/21	/90	Somerset County	Diana Vigilante	201-231-7031	Radiac	718-963-2233	0.00		0
New Jersey	Northfield $	04/28	/90	Atlantic Co Util Aut	Gary Strich	609-348-3700	Rollins Chempak Inc	302-651-7909	75800.00	140 drums,20000pound	250
New Jersey	Atlantic County	04/28	/90	Atlantic County Util	Gary Strich	609-348-3700	Rollins ChemPak Inc	302-651-7909	140665.00	49858 pounds	0
New Jersey	Hunterdon(2dy)	05/07	/90	County	Teresa Martin	201-788-1110	Radiac	718-963-2233	0.00	230001b. 127 drums	400
New Jersey	Mt. Holly	05/12	/90	Burlington County	Ann Williams	609-499-1001	Chem.Wst.Management	201-465-4145	37000.00	5700 lbs	300
New Jersey	Monmouth County	05/12	/90	Monmouth Cty.Health	Myron LaVake	201-431-7456	Waste Conversion	215-822-8995	70000.00	40000lbs	350
New Jersey	Mercer	05/14	/90	Mercer of County		609-695-1200	Radiac	718-963-2233	0.00	173 drums	0
New Jersey	Camden	05/16	/90	Camden County		609-757-6914	Radiac	718-963-2233	0.00	239 drums	0
New Jersey	Ocean County(3dy)	05/22	/90	Ocean County		201-929-2054	Radiac	718-963-2233	0.00	400 drums	0
New Jersey	Lafayette Township	06A11	/90	Sussex County Util.A	John J. Canasta		AETC	201-347-7111	100000.00		0
New Jersey	Middlesex County	06/04	/90	Middlesex County		201-745-4170	Radiac	718-963-2233	0.00	180 drums	0
New Jersey	Somerset County	06/08	/90	Somerset County	Diana Vigilante	201-231-7031	Radiac	718-963-2233	0.00		0
New Jersey	Elizabeth $	06/08	/90	Union County	Joann Gonsenden	201-527-4215	Radiac Research	718-963-2233	71000.00	279-55 gallon drums	650
New Jersey	Union	06/11	/90	Union County		201-527-4215	Radiac	718-963-2233	0.00	279 drums	0
New Jersey	Morris County	06/18	/90	Morris County	201-285-1667		Radiac	718-963-2233	0.00		0
New Jersey	Sussex County	06/26	/90	Sussex County		201-383-2820	Radiac	718-963-2233	0.00	155 drums	0
New Jersey	Hunterdon	07/21	/90	County	Teresa Martin	201-788 1110	Radiac	718-963-2233	0.00		400
New Jersey	Somerset County	08/04	/90	Somerset County	Diana Vigilante	201-231-7031	Radiac	718-963-2233	0.00		0
New Jersey	Monmouth County	09/15	/90	Monmouth Cty.Hlth.De	Myron LaVake	201-431-7456	Waste Conversion	215-822-8995	70000.00	40000lbs.	350
New Jersey	Ocean County(3dy)	09/15	/90	Ocean County		201-929-2054	Radiac	718-963-2233	0.00	496 drums	0
New Jersey	Atlantic County	09/29	/90	Atlantic County Util	Gary Strich	609-348-3700	Rollins ChemPak Inc.	302-651-7909	0.00	16 tons HHW	500
New Jersey	Gloucester County	10/	/90	Gloucester County Pl	Janet Miller	609-863-6661			40000.00		200
New Jersey	Hunterdon	10/06	/90	County	Teresa Martin	201-788-1110	Radiac	718-963-2233	0.00		400
New Jersey	Atlantic County	10/06	/90	Atlantic County Util	Gary Strich	609-348-3700	Rollins ChemPak Inc.	302-651-7909	0.00		0
New Jersey	Monmouth County	10/13	/90	Monmouth Cty.Hlth.De	Myron LaVake	201-431-7456	Waste Conversion	215-822-8995	70000.00	40000lbs.	350
New Jersey	Somerset County	10/20	/90	Somerset County	Diana Vigilante	201-231-7031	Radiac	718-963-2233	0.00		0
New Jersey	Passaic County	10/20	/90	Passaic County		201-881-4490	Radiac	718-963-2233	0.00		0
New Jersey	Camden	10/20	/90	Camden County		609-757-6914	Radiac	718-963-2233	0.00		0
New Jersey	Mercer	10/20	/90	Mercer County		609-695-1200	Radiac	718-963-2233	0.00		0
New Jersey	Mt. Holly	10/27	/90	Burlington County	Ann Williams	609-499-1001	Chem.Wst.Management	201-465-4145	37000.00	6000lbs.	300
New Jersey	Warren County	10/27	/90	Pollution Control	Mary Briggs	201 453-2174	Radiac	718-963-2233	0.00		0
New Jersey	Middlesex County	11/	/90	Middlesex County		201-745-4170	Radiac	718-963-2233	0.00		0
New Jersey	Morris County	11/03	/90	Morris County		201-285-1667	Radiac	718-963-2233	0.00		0
New Jersey	Sussex County	11/03	/90	Sussex County		201-383-2820	Radiac	718-963-2233	0.00		0
New Mexico	Albuquerque	04/21	/90	City of Albuquerque	Mile Myers	505 768-2600	Riechen	505 345-2600	37000.00	34000 lbs.	987
New Mexico	Albuquerque	09/29	/90	City of Albuquerque	Mile Myers	505-768-2600	Riechen Company Inc.	505-345-3655	64000.00	51000 lbs	1146
New York	Southold DB		/90	Town of Southold	Mr. Jacobs	516/765-3140	Mercury Refining	800-833-3505	0.00		0
New York	Cataragus County DB		/90	County DPW	Richard Preston	716-938-9121	Mercury Refining	800-833-3505	400.00	1100+ lbs alkaline,c	0
New York	Rochester DB		/90	Rochester Metro LWV	Alice Young	716/232-3310	Mercury Refining	201/453-2174	0.00		0
New York	Southold*		/90	Town of Southold	James McMahon	516-765-1892			0.00		0
New York	New York City DB		/90	Env. Action Coalitio	Tim Forker	212-677-1601	Mercury Refining	800-833-3505	0.00		0
New York	Oyster Bay	03/17	/90	Town	Andrea Reiss	516-921-7247	Chem.Management	516-154-6766	15000.00	70 drums	210

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STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
New York	Westchester(2dy) S	03/22	/90	Sewey Purchase St.Un	Carlos Torres	914-285-5038	Radiac	718-963-2233	35000.00	87 drums	22
New York	North Hempstead	03/31	/90	Town	Rhoda Becker	516-627-0540	Chem.Management	516-454-6766	20000.00	24 drums	287
New York	Oyster Bay	04/21	/90	Town	Andrea Reiss	516-921-7247	Chem.Management	516-454-6766	20000.00	78 drums	339
New York	Montgomery	04/22	/90	Town	Steve Bonsell	607-547-4289	Chem.Management	516-454-6766	700.00	4 drums	160
New York	North Hempstead(2dy)	04/28	/90	Town	Rhoda Becker	516-627-0540	Chem.Management	516-454-6766	12000.00	35 drums	512
New York	Cooperstown *	04/28	/90	SHRA	Sharon Rehder	518-457-6072	Chem.Management	516-454-6766	700.00	4 drums	78
New York	Herkimer	05/05	/90	Solid Wst.Management	Kevin Hanlon	315-798-5474	Laidlaw Northeast	508-683-1002	150000.00	169 drums	479
New York	Utica-Rome	05/05	/90	Town	Kevin Hanlon	315-798-5474			150000.00	187 drums	393
New York	Utica-Rec.Center	05/05	/90	Town	Kevin Hanlon	315-798-5474	Laidlaw Northeast	508-683-1002	110000.00	138 drums	486
New York	Huntington	05/05	/90	Town	Janet Dieterich	516-351-3186	Radiac	718-963-2233	14000.00	78 drums	412
New York	Village of Babylon	05/12	/90	Village of Babylon	Ralph Scardino		Chem. Poll. Control	516 586-0333	10000.00	25 drums	88
New York	Oyster Bay	05/12	/90	Town	Andrea Reiss	516-921-7247	Chemical Management	516-454-6766	10000.00	66 drums	167
New York	Hempstead	05/19	/90	Town	Patricia McKendon	516-457-6072	Chem.Management	516-454-6766	14000.00	94 drums	312
New York	Putnam County	05/19	/90	Dept.Health	Ann Bitner	914-225-0310	Radiac	718-963-2233	13000.00	16 drums	15
New York	Glenn Cove	06/02	/90	Town	Anna Iverson	516-676-2000	Chemical Management	516-454-6766	9000.00	75 drums	179
New York	City of Niagara Fall	06/02	/90		David Brooks	716-286-4466	Cecos Int.	716-873-7500	15000.00	26 drums	215
New York	Ickwood	06/16	/90	Town of Ickwood	Julie Noldecker	516 224-5640	Chem. Poll. Control	516 586-0333	0.00		0
New York	Oyster Bay	06/16	/90	Town of Oyster Bay	Andrea Reiss	516-921-7247	Chem.Management	516-454-2233	0.00		0
New York	Islip	06/16	/90	Town	Julia Noeldechan	516-224-5640	Chem.Pollu.Control	516-586-0333	0.00		459
New York	Tonawanda	06/16	/90	County of Erie	Gerie Kotas	716-858-8559	BFI-CECOS	716-873-7500	0.00		0
New York	Lindenhurst	06/23	/90	Town of Babylon	Carole Wilder	516-422-7640	Chemical Management	516-454-2233	0.00		0
New York	Carle Place	06/30	/90	Town of N.Hempsted	Rhoda Becker	516-627-0590	Chemical Management	516-454-6766	0.00		0
New York	Valhalla	06/30	/90	Westchester County	Carlos Torres	914-285-5038	Radiac	718-963-2233	0.00		0
New York	Wyandanch	06/30	/90	Town of Babylon	Carole Wilder	516-422-7640	Chemical Management	516-454-6766	0.00		0
New York	Westchester	06/30	/90	Westchester County	Carlos Torres	914-285-5038	Radiac	718-963-2233	0.00	651 drums	0
New York	Oneida & Herk.(2dy)*	07/06	/90	Counties	Kevin Hanlon	315-798-5474			0.00		0
New York	Herkimer Cty.(2dy)*6	07/13	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Sea Cliff	07/14	/90	Town of Oyster Bay	Andrea Reiss	516-921-7247	Chemical Management	516-454-6766	0.00		0
New York	Herkimer Cty.(2dy)*6	07/20	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Herkimer Cty.(2dy)*6	07/27	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Great Neck	07/28	/90	Town of North Hempst	Rhoda Becker	516-627-0590	Chemical Management	516-454-6766	0.00		0
New York	Herkimer Cty.(2dy)*6	08/03	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Herkimer Cty.(2dy)*6	08/10	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Herkimer Cty.(2dy)*6	08/17	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Plainview	08/18	/90	Town of Oyster Bay	Andrea Reiss	516-921-7247	Chemical Management	516-454-6766	0.00		0
New York	Herkimer Cty.(2dy)*6	08/24	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Manhasset	08/25	/90	Town of North Hempst	Rhoda Becker	516-627-0590	Chemical Management	516-454-6766	0.00		0
New York	Herkimer Cty.(2dy)*6	08/31	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Herkimer Cty.(2dy)*6	09/07	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Lindenhurst	09/08	/90	Town of Babylon	Carole Wilder	516-457-6072	Chemical Management	516-454-6766	0.00		0
New York	Nassau County*	09/08	/90	County	Bart Polizzotti	516-997-8982	Chemical Management	516-454-6766	0.00		0
New York	Herkimer Cty.(2dy)*6	09/14	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Brentwood	09/15	/90	Town of Islip	Julia Noeldechan	516 224-5640	Chemical Poll.Contl.	516-586-0333	0.00		0
New York	Albany	09/15	/90	City of Albany	Kevin Byng	518 432-1144	Clean Harbors	508-655-8883	0.00		0
New York	East Norwich	09/15	/90	Town of Oyster Bay	Andrea Reiss	516-921-7247	Chemical Management	516-454-6766	0.00		0
New York	Herkimer Cty.(2dy)*6	09/21	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	New Hyde Park	09/22	/90	Town of North Hempst	Rhoda Becker	516-627-0590	Chemical Management	516-454-6766	0.00		0
New York	Utica	09/22	/90	County of Oneida	Kevin Hanlon	315-798-5474	Laidlaw Northeast	508-683-1002	0.00		0
New York	Rome	09/22	/90	County of Oneida	Kevin Hanlon	315-798-5474	Laidlaw Northeast	508-683-1002	0.00		0
New York	Herkimer	09/22	/90	County of Herkimer	Kevin Hanlon	315-798-5474	Laidlaw Northeast	508-683-1002	0.00		0
New York	New Hyde Park	09/23	/90	Town of North Hempst	Rhoda Becker	516-627-0590	Chemical Management	516-454-6766	0.00		0
New York	Herkimer Cty.(2dy)*6	09/28	/90	Herkimer & Oneida Ct	Kevin Hanlon	315-798-5474			0.00		0
New York	Babylon	10/06	/90	Town of Babylon	Carole Wilder	516-422-7640	Chemical Management	516-454-6766	0.00		0
New York	Dutchess County	10/06	/90	Dutchess County	C. Scott Daniels	914-462-0334			0.00		0
New York	Massapequa	10/13	/90	Town of Oyster Bay	Andrea Reiss	516-921-7247	Chemical Management	516-454-6766	0.00		0
New York	Tompkins County(2sit	10/13	/90		Sharon Rehder	518-457-6072			0.00		0
New York	Oswego County(2site)	10/13	/90	Oswego County	Aurelie Ashley-Marx	315-349-8329	Laidlaw NE	508-683-1002	0.00		0
New York	Westchester County	10/13	/90	Westchester County	Carlos Torres	914-285-5038			0.00		0
New York	Carle Place	10/27	/90	Town of North Hempst	Rhoda Becker	516-627-0590	Chemical Management	516-454-6766	0.00		0

	TION		TH ONSOR	CONTAC	PHONE	HAN EW	SPWNP	COST	WASTE	PARTICIP
New York	Glen Cove	10/27	/90	City of Glen Cove	Anna Iverson	516-676-2000	Chemical Management	516-454-6766	0.00		0
New York	Westchester County	11/03	/90	Westchester County	Carlos Torres	914-285-5833	Radiac	718-963-2233	0.00		0
New York	Old Bethpage	11/10	/90	Town of Oyster Bay	Andrea Reiss	516-921-7247	Chemical Management	516-454-6766	0.00		0
New York	Port Washington	11/17	/90	Town of North Hempst	Rhoda Becker	516-627-0590	Chemical Management	516-454-6766	0.00		0
New York	Syosset	12/15	/90	Town of Oyster Bay	Andrea Reiss	516-921-7247	Chemical Management	516-454-6766	0.00		0
North Carolina	Winston-Salem	10/26	/90	City of Winston-Sale	Tom Griffin	919 727-8418	AETC	919-528-3996	80000.00		435
North Carolina	Raleigh	04/07	/90	City/Dept. Public Ut	Cindy Kling	919 890-3480	Laidlaw	800 334-5953	162000.00	2500gal-^,422 batter	1759
North Carolina	Greensboro	09/29	/90	City of Greensboro	Wayne Turner	919-373-2167	AETC	919-528-3996	0.00	1800gal@,320batt,29-	1491
North Carolina	Craven County (8 sit	11/01	/90	Craven County	George Sawyer	919-638-6600	Waste Industries	919-633-2175	0.00		0
North Carolina	Durham	11/10	/90	Durham	Cindy Kling	919-890-3480	AETC	919-528-3996	0.00		0
North Carolina	Raleigh	11/17	/90	City of Raleigh	Cindy Kling	919-890-3480	AETC	919-528-3996	0.00	6719 gal 40850 pound	1415
North Dakota	Statewide Pickup@	summr	/90	State/EPA	Christine Roob	701-224-2366	Spec.Resource Man.	800-445-4404	0.00		0
Ohio	Lima	04/28	/90	WIMTradio,OhioEPA	Henry Hollinger	419 228-3700	Clark Processing	800 543-3670	14000.00	17tons,137drums2500g	560
Ohio	Columbus@	04/28	/90	Valvoline Inst.Oil C	Darrell Gordon	614-231-4603			0.00		0
Ohio	Dayton-Montgomery	05/12	/90	WHIO T.V./Clark Proc	James Lyman	513 225-6145	Clark Processing	800-543-3670	0.00	24tons,100 carbatter	550
Ohio	Montgomery County	11/10	/90	Mont.County SWM Dept	James Lyman	513-225-6145	Clark Processing	800-543-3670	30000.00	70 tons	1021
Oklahoma	Tulsa(2dy)	04/21	/90	Tulsa County Hlth.De	Mike Wright	918-744-1000			0.00	5600gl oil/1525 car	1318
Oregon	Corvallis	04/14	/90	Corvallis Disp.Compan	Jeff Andrews	503-754-0444	ChemPro	206-223-0500	0.00		0
Oregon	Portland, Metro Regi	04/21	/90	Metropolitan Serv.Di	Sandy Garkovitz	503-221-1646	N.W.Envir.Services	206-622-1090	271841.00		3657
Oregon	Lane County	05/	/90	Lane County Waste Mg	Leslie Anthowiak	503-687-4119	Chemical Processors	206-935-8743	41532.00	123 55 gallon drums	329
Oregon	Lane County	05/19	/90	Lane County	Mike Turner	503-687-4119	Chem.Pro	206-223-0500	30000.00	100drums	325
Oregon	Portland Metro Regio	11/03	/90	Metropolitan Serv.Di	Sandy Garkovitz	503-221-1646			0.00		0
Oregon	Lane County	Sept.	/90	Lane County	Mike Turner	503-687-4119			0.00		0
Pennsylvania	Newton Square	06/23	/90	Arco Chem/ Town	Gerry Davis	215-359-3198	Laidlaw	800-845-1019	0.00	150 drums	350
Pennsylvania	Lancaster*	09/	/90	Lanc.County SWMA	Rachel Rosenzweig	717-397-9968			0.00		0
Pennsylvania	York County (3 day)	10/04	/90	York County SWA	Gregg Pearson	717-845-1066	AETC	201-347-7111	0.00		1400
Pennsylvania	Northern York County	10/05	/90	York County SWA	Greg Pearson		AETC	201-347-7111	0.00		0
Pennsylvania	York County	10/06	/90	York County SWA	Greg Pearson		AETC	201-347-7111	0.00		700
Rhode Island	Narragansett	05/05	/90	State of Rhode Islan	Jeff Crawford	401-277-2797	Clean Harbors	508-655-8863	54000.00	135 drums	405
Rhode Island	Providence	05/12	/90	State of Rhode Islan	Jeff Crawford	401-277-2797	Clean Harbors	508-655-8863	57792.50	161 drums	485
Rhode Island	South Middletown	09/08	/90	State of Rhode Islan	Jeff Crawford	401-277-2797	Clean Harbors	508-655-8863	46270.00	23 55gal drums	404
Rhode Island	Newport	09/08	/90	Newport	Jeff Crawford	401-277-2797	Clean Harbors	508-655-8863	0.00		0
Rhode Island	West Warwick	09/22	/90	State of Rhode Islan	Jeff Crawford	401-277-2797	Clean Harbors	508-655-8863	89082.00	41 55gal drums	800
South Carolina	Spartanburg	04/07	/90	Spartanburg	Liz McCormick	800-845-1019	Laidlaw		0.00		0
South Carolina	Columbia	04/21	/90	CLWV	Joan Williams	803-771-0063	Laidlaw	800-845-1019	0.00		0
Southington	Southington	09/15	/90	Town of Southington	Elaine Parker		Laidlaw	508-683-1002	0.00		0
Tennessee	Knox County	05/12	/90	LWV,Knox.Recyc.Coali	Peggy Douglas		Laidlaw	800-845-1019	61000.00	192001bs.	413
Texas	Austin	04/28	/90	Envir.&Conservation	Bob Fernandez	512 499-3500	Laidlaw Env. Servic.	800-845-1019	130000.00	2002^,3850gal-oil,69	1750
Texas	Port Arthur	11/03	/90	Chemical Waste Man.	Marlies Good	409-238-2305	Chemical Waste Man.	409 736-2821	0.00		0
Texas	Beaumont	11/10	/90	Chemical Waste Man.	Marlies Good	409-238-2305	Chemical Waste Man.	409 736-2821	0.00		0
Texas	Dallas County	11/17	/90	HHW Task Force		214-670-8684			0.00		0
Texas	Orange	11/17	/90	Chemical Waste Man.	Marlies Good	409-238-2305	Chemical Waste Man.	409 736-2821	0.00		0
Utah	Salt Lake City	04/21	/90	County Health Dept.	Ted Diamont	801 534-4537	USPCI	405-324-4200	700000.00		1000
Utah	Layton/school/busine	Summr	/90	Cty. Health Dept.	LeGrand Bitter	801-771-3032	USPCI	405-324-4200	0.00		0
Vermont	VT/NH DE		/90	NH/VT Solid Waste Pr	Carl Hirth	603-543-1201	Mercury Refining	800-833-3505	0.00		0
Vermont	Upper Valley Lake Re	05/05	/90	Upper Valley Lake Re	Judy Bowden	802 448-1680	Pollution Solution	802-860-1200	0.00		0
Vermont	Middlebury ^	05/19	/90	City	Trina Stevenson	802 388-2333	Pollution Solution	802-860-1200	0.00	paint-500 gallons	0
Vermont	Addison County^	05/19	/90	Addison County	Trina Stevenson	802-388-2333	Pollution Solution	802-860-1200	0.00	440 gallons	0
Vermont	Williston ^	06/02	/90	Pollution Solution	Martha Sanderland	802 655-9801	Pollution Solution	802-860-1200	0.00		0
Vermont	Chittenden County^(2	06/02	/90	Chittenden County	Bob Winters	802-655-9801	Pollution Solution	802-860-1200	0.00	10 55 gallon drums	200
Vermont	Bennington County^	09/22	/90	County of Bennington	Carolyn Mitchell	802-375-9964	Pollution Solution	802-860-1200	0.00	750 gallons	0
Vermont	Central Vermont area	10/20	/90	State/Counties	Michael Bender	802-229-0389	Pollution Solution	802-860-1200	0.00		0
Vermont	Rutland County	11/03	/90	Rutland County	Steve Parker	802-775-6482	Clean Harbors	508-655-8863	0.00		0
Virginia	Chesapeake*		/90	SE Public Service AU	Jennifer Ladd	804-420-4700	Chemical Waste Mgt.	201-465-6848	0.00		0
Virginia	Arlington*		/90	Water Poll.Control P	Dennis Wisler	703-358-6832	Ecoflo	301-498-4550	0.00		0
Virginia	Fairfax*	02/03	/90	Fairfax County Fire	David Duncan	703-246-3971	Laidlaw	800-845-1019	480533.00		0
Virginia	Alexandria*	02/03	/90	Fairfax County Fire	David Duncan	703-246-3971	Laidlaw	800-845-1019	0.00		0
Virginia	Leesburg	04/21	/90	Loudon County			Laidlaw	800-845-1019	0.00		0
Virginia	Manassas	04/28	/90	Prince William Cty.	Lynn Fass	703-335-7326	Laidlaw	800-845-1019	0.00		0

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STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	FAMILIES
Virginia	Alexandria	05/05	/90	City of Alexandria	Dick Croxford	703-838-4488	Laidlaw	800-345-1019	45081.39	12.9 tons	832
Virginia	Norfolk* - TBA	05/05	/90	SE Pub.Serv.Auth.of	Jennifer Ladd	804-420-4700	Laidlaw	800-345-1019	0.00		0
Virginia	Fairfax County	07/12	/90	Fairfax County	Dave Duncan	703-218-3430	Laidlaw	800-345-1019	0.00		0
Virginia	Virginia Beach*	08/04	/90	SE Public Service Au	Jennifer Ladd	804-420-4700	Chemical Waste Mgt.	291-465-6848	0.00		0
Virginia	Charlottesville	08/04	/90	City of Charlottesvi	Emaretta Sapp	804-980-3814	GSX Services Inc.	919-362-6106	46291.00	2klbspest4k*150gal6	223
Virginia	Franklin*	10/00	/90	SE Public Service Au	Jennifer Ladd	804-420-4700	Chemical Waste Mgt.	291-465-6848	0.00		0
Virginia	Alexandria	11/03	/90	City of Alexandria	Dick Croxford	703-838-4488	Laidlaw	800-345-1019	0.00		0
Washington	Seattle*		/90	Seattle Solid Wst. U	Henry Draper	206-296-4404	N.W. Envire. Serv.	206 822-1090	191230.00	17572 gls. waste	2177
Washington	Seattle*)		/90	King Cty.Sol.Wst.Div	Henry Draper	206-296-4404	ChemPro	206-223-0500	0.00		0
Washington	Thurston County*		/90	Cty.Health Dept.	Marie Zaroske	206-786-5458	ChemPro	206-223-0500	0.00		0
Washington	Whatcom County*		/90	Bellingham PW Dept.	David Bader	206-676-6724	ChemPro	206-223-0500	0.00		0
Washington	Wahoegal*		/90	ChemPro, Inc.	Al Kakovich	206-223-0500	ChemPro	206-223-0500	0.00		0
Washington	Bellingham DB		/90	Bellingham and TRC	Lisa Schaebele	206-384-1057	Mercury Refining	800-833-3505	0.00		0
Washington	Klickitat County(3dy		/90	County	Frank Ensell	509-773-4616	ChemPro	206-223-0500	0.00		0
Washington	King Cty Wastemobile		/90	King County	Henry Draper	206-296-4404	ChemPro	206-223-0500	0.00		0
Washington	Kirkland	03/	/90	City of Kirkland	Grace Stewart	206-828-1143			0.00	Education Only	0
Washington	Cheyne Landfill	03/10	/90	County Public Works	Mark Nedrow	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Yakima County(3dy)	03/10	/90	Yakima County	Mark Nedrow	509-575-4076	ChemPro	206-223-0500	0.00		0
Washington	Snipes Landfill	03/17	/90	County Public Works	Mark Nedrow	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Terrace Heights	03/24	/90	County Public Works	Mark Nedrow	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Kennewick (2 site)	04/21	/90	Town/County of Kenn.	Andrew Dixon	509-943-9185	ChemPro	206-223-0500	81000.00	219 drums	750
Washington	Vancouver	04/21	/90	Health District	Debi Van Scotter	206-696-8428	ChemPro	206-223-0500	64515.00		0
Washington	Benton/Franklin Coun	04/21	/90	Benton/Franklin Coun	Andrew Dixon	509-528-2288	ChemPro	206-223-0500	105063.00		0
Washington	Tacoma & Puyallup(2d	04/23	/90	Tacoma-Pierce County	Doug Pierce	206-591-5543	ChemPro	206-223-0500	100000.00	275 drums	1200
Washington	Tacoma(8dy, 2Sites)	04/23	/90	City of Tacoma	Doug Pierce	206-591-5543	ChemSafe-ChemPro	509-968-3973	100000.00	5500gl-oil, 4500gl-pa	1817
Washington	Everett*-Drop&Swap	04/28	/90	Snohomish County SWD	Jack Wolfin	206-338-3425	G.L. Construction		95000.00	6000 for disposal	650
Washington	Snohomish County(4si	05/05	/90	Snohomish Cty.Pub.Wo	Nancy Waddell	206-388-3488	ChemPro	206-223-0500	10000.00	296 55 gallon drums	1000
Washington	Spokane(2dy)	05/12	/90	Solid Wst. Mgt. Dept	Dennis Hein	509 456-2260	ChemSafe-Nick Smith	509 968-3973	0.00		0
Washington	Tacoma ?	05/14	/90	Pierce County	Doug Pierce	206 591-5543	ChemSafe-Nick Smith	509 968-3973	0.00		1700
Washington	Olympia/Yelm	05/19	/90	Thurston County/Pub.	Marie Zaroske	206-786-5457	ChemPro	206-223-0500	0.00		0
Washington	Spokane-Coliseum(2dy	06/01	/90	City and County-S,.2	David Hans	509-456-2602	ChemSafe	509-968-3973	60000.00	75 drums	2000
Washington	Pacific County(2dy)	06/02	/90	Pacific County Hth.D	Brian Harrison	206 875-9343	ChemSafe-Nick Smith	509 968-3973	0.00		0
Washington	Longview/Cathlamet	06/02	/90	Coulitz/Wahkiakum Ct	Don Olsen-Pub.Works	206-577-3126	ChemPro	206-223-0500	0.00		0
Washington	Pacific County	06/02	/90	Pacific	Nick Smith		Chem-Safe	509-968-3973	0.00		108
Washington	Cheyne Landfill	06/09	/90	County Public Works	Mark Nedro	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Pacific County	06/09	/90	Pacific County	Brian Harrison	206-484-7136	ChemSafe	509-968-3973	15000.00	59 drums/130 batteri	216
Washington	Longview	06/09	/90	Weyhaeuser, Inc.	Bob Orr-ChemPro	206-223-0500	ChemPro	206-223-0500	0.00		0
Washington	Pacific County	06/09	/90	Pacific County	Nick Smith	509-968-3973	Chem Safe	509-968-3973	0.00		108
Washington	Yakima(3dy)	06/09	/90	County, State grant	Mark Nedrow	509-575-4076	ChemPro	206-223-0500	0.00		0
Washington	Coulitz/Wahkiakum Ct	06/09	/90	Coulitz County	Steve Langdon	206-577-3041	ChemPro	206-223-0500	48280.00		0
Washington	Snipes Landfill	06/16	/90	County Public Works	Mark Nedrow	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Terrace Heights	06/23	/90	County Public Works	Mark Nedrow	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Thurston County?	06/28	/90	State	Lee Faulconer	206-753-5064	ChemPro	206-223-0500	0.00		0
Washington	Clallam County E	09/00	/90	WSU Coop.Ext. Servic	Marycile Olezer	206-452-7831			0.00	Sept.-Nov. Education	0
Washington	Mason County(2dy)	09/07	/90	County,State,Hood Ca	Paul Johnston	206-385-0722	ChemPro	206-223-0500	37234.00		0
Washington	Centralia	09/08	/90	City,County,state gr	Lee First	206-736-8284	ChemPro	206-223-0500	67000.00	2121g pt 1200g oil 3	550
Washington	Lewis County, WA Sta	09/08	/90	County,Centraglia-Ci	Lee First	206-736-8284	Chempro, Inc.	206-223-0500	0.00		0
Washington	Jefferson County(2dy	09/14	/90	County,State,Hood Ca	Linda Atkins	206-385-0722	ChemPro	206-223-0500	0.00		0
Washington	Silverdale(2dy)	09/20	/90	County,State,Hood Ca	Annie Bringloe	206-895-3931	ChemPro	206-223-0500	0.00		0
Washington	Port Orchard(2dy)	09/25	/90	County,State,Hood Ca	Annie Bringloe	206-895-3931	ChemPro	206-223-0500	0.00		0
Washington	Franklin County?(2dy	09/25	/90	State	Lee Faulconer	206-753-5064	ChemPro	206-223-0500	0.00		0
Washington	Clallam County(2dy)	09/28	/90	County,State,Hood Ca	Andy Brastad	206-452-7831	ChemPro	206-223-0500	0.00		0
Washington	Skagit County	09/29	/90	County, State grant	Theresa Thiaes	206-336-9400	ChemPro	206-223-0500	60000.00		0
Washington	Tacoma*	10/	/90	City of Tacoma	Doug Pierce	206-591-5543			0.00		0
Washington	Tacoma-Pick up Progr	10/	/90	City of Tacoma	Doug Pierce	206-591-5543			0.00		0
Washington	Edmonds	10/08	/90	Snohomish County	Jack Wolfin	206-388-6496	ChemPro	206-223-0500	0.00		0
Washington	Everett(3dy)	10/11	/90	Snohomish County	Jack Wolfin	206-338-3425	ChemPro	206-223-0500	0.00		0
Washington	Cheyne Landfill	10/13	/90	County Public Works	Mark Nedro	509-575-4151	ChemPro	206 223 0500	0.00		0
Washington	Yakima County(3dy)	10/13	/90	Yakima County	Mark Nedrow	509-575-4076	ChemPro	206-223-0500	39620.00		0

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Washington	Edmonds(3dy)	10/15	/90	Snohomish County	Jack Wolfin	206-388-6496	ChemPro	206-223-0500	0.00		0
Washington	Spokane County#	10/17	/90	State	Lee Faulconer	206-753-5064	ChemPro	206-223-0500	0.00		0
Washington	Everett(3dy)	10/18	/90	Snohomish County	Jack Wolfin	206-388-6496	ChemPro	206-223-0500	0.00		0
Washington	Snipes Landfill	10/20	/90	County Public Works	Mark Nedro	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Klickitat County(3dy	10/20	/90	Klickitat County	Frank Enzell	509-773-4616	NW Environmental	907-428-1742	45000.00		0
Washington	Skagit County	10/24	/90	Skagit County	Mike Dreawright	206-458-8297	Chemical Processors	206-223-0500	0.00	34 tons HHW	0
Washington	Marysville(3dy)	10/25	/90	Snohomish County	Jack Wolfin	206-338-3425	ChemPro	206-223-0500	0.00		0
Washington	Terrace Heights	10/27	/90	County Public Works	Mark Nedro	509-575-4151	ChemPro	206-223-0500	0.00		0
Washington	Monroe(3dy)	11/01	/90	Snohomish County	Jack Wolfin	206-338-3425	ChemPro	206-223-0500	0.00		0
Washington	Lynwood(2dy)	11/08	/90	County Public Works	Jack Wolfin	206-338-3425	ChemPro	206-223-0500	0.00		0
Washington	Kirkland(10dy)	12/13	/90	City of Kirkland,gra	Rich Conlin	206-382-5013	ChemPro	206-223-0500	0.00		0
West Virginia	Charleston 9	04/21	/90	West V.Manuf.Assoc.	Stephanie Wright	304-759-4378	Chem.Wst.Management	614-836-0440	50000.00	173-55gl dms. 125 ba	800
Wisconsin	West Allis	05/23	/90	City	Terry Brandenburg	414/256-8400			0.00		0
Wisconsin	Green Bay	05/12	/90	Brown County	Chuck Liechow		Aquatech Labs.	414-284-5716	43000.00	39 Containers	0
Wisconsin	West Bend	05/12	/90	City of West Bend	John Butschlick	414-338-5063	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Manitowoc	05/13	/90	Manitowoc County	Jeff Beyer	414-683-4085	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Kenosha	05/19	/90	Kenosha Health Dept.	Randy Wergin	414-656-8170	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Wausau	05/13	/90	Marathon County	Jim Pelletari	715-847-5000	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Milwaukee(City Garag	05/15	/90	DPW, City of Milwauk	Connie Lindholm	414-278-2845	Chemical Waste Mgt.	708-369-9543	0.00		0
Wisconsin	Waupaca	05/15	/90	Waupaca County	Roger Holman	715-258-6420	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Appleton	05/22	/90	Outagamie County	Martin Helling	414-832-5148	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Altoona	05/29	/90	Eau Claire County	Ruth Schulze	715-839-4742	Chemical Waste Mgmt.	708-369-9543	24200.00	43-55gallon Drums in	225
Wisconsin	Dane County*	05/29	/90	Dane County DPW	Dennis Sepcich	608-266-4029	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Chippewa Falls	05/22	/90	Chippewa County	Bill Knoll	715-723-1831	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin	Sheyboygan	10/	/90	City of Sheyboygan	Bob Kuhlmann	414-459-3386	EAK Hazardous Waste	414-458-8030	0.00		0
Wisconsin0	Ellsworth	11/03	/90	WI Dept. of Agricult	Greg Andrews	715-273-3531	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin0	Sturgeon Bay	11/10	/90	WI Dept. of Agricult	Dennis Skahen	414-743-5511	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wisconsin0	Stevens Point	11/12	/90	WI Dept. of Agricult	John Leatherman	715-346-1319	Chemical Waste Mgmt.	708-369-9543	0.00		0
Wyoming	Casper	05/16	/90	Northern Gas Co./Cou	Tim Link	307-777-7752	USPCI or Laidlaw	800-845-1019	0.00		0
									14292041.41		174587

Appendix VI

Permanent HHWM Program Managers

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HHW Collection Permanent Program Managers — 1990

Shirli Axelrod
HHW Project Coordinator
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Kalamazoo Co. Environmental Health
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WA Toxics Coalition
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Fairfax, VA 22030
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Palm Beach County Solid Waste Authorit
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West Palm Beach, FL 33412-2402
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Whatcom County Health Department
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Kandiyohi County
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King County Solid Waste Division
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Kent County Department of Public Works
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Witchita, KS 67214
316-268-8351

Source: Dana Duxbury & Associates — January 1991

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Noxious Weed Department
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Hazardous Materials Branch
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John Stufflebean
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602-744-9795 F

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Winona County Solid Waste Dept
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Solid Waste Manager
City of Olathe
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Kathleen Warren
Program Director, HHW Program
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Dennis Wisler
HHW Coordinator
Arlington County Water Pol. Cntr. Div
3401 South Glebe Road
Arlington, VA 22202-2398
703-358-6832

Appendix VII

National HHW Management Expert List

National HHW Management Expert List — 1990 - 1991

Fernando Berton
Manager, HHW Management Program
California Integrated Waste Mnmgt. Bd.
1020 Ninth Street, Suite 300
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916-323-3725 F

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Projects Director
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Joan Dotson (E)
Household Hazardous Waste Specialist
League of Women Voters, California
132 Anita Court
Redlands, CA 92373
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Dana Duxbury
President
Dana Duxbury & Associates
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Andover, MA 01810
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508-470-3384 F

Jay Feldman (pe)
National Coordinator, Ntl.Coalition
Against the Misuse of Pesticides
530 7th Street, SE
Washington, DC 20003
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Cynthia Fridgen
Dept. of Resource Development
Michigan State University
311-A Natural Resources Building
East Lansing, MI 48824
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Janet H. Graham (O)
Project ROSE Coordinator
University of Alabama
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Ingham County Health Dept.
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517-887-4310 F

Robert Denny (pe)
Office of Pesticide Programs
U.S. EPA
401 M Street SW H-7507C
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Henry Draper (PE)
Program Coordinator
King County Solid Waste Division
500 4th Avenue, Room 450
Seattle, WA 98104
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206-296-0197 F

Melanie Evers
Environmentalist
NH DES, Waste Management Division
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Concord, NH 03301-6509
603-271-2047

Judi Frantz
Assoc.Hazardous Materials Specialist
California Dept. of Health Services
10151 Croydon Way
Sacramento, CA 95827-2106
916-855-7759 P
916-855-7750 F

David Galvin
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Appendix X

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HHW90				
1	Keynote: **Sylvia Lowrance**; Where We Are, Where We're Going - **Dana Duxbury**; Setting Goals, Evaluating Progress - **David Galvin**	1	9.00	11.00
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25	V.D. Planning (Washington ; Seattle, Rural & Med. Sized County Plans) **Michael Frishman**	1	9.00	11.00
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27	Panel: How to Get Manufacturers Involved in HHWM Issues; Future Issues; Closing	1	9.00	11.00
28	Legislation/Regulations - **Anna Ward, Fernando Berton, Rubia Bertram, Dorothy Fettig**	1	9.00	11.00
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Appendix XII

Paint, Dry Cell Battery, and Used Oil Experts

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